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TECHNICAL MANUAL

ARMY AMMUNITION DATA SHEETS

ARTILLERY

AMMUNITION

GUNS, HOWITZERS,

MORTARS,

RECOILLESS RIFLES,

GRENADE LAUNCHERS,

AND

ARTILLERY FUZES

(FSC 1310, 1315, 1320, 1390)

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7-13	1	7-75	0
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7-18	1	7-77	0
7-19	0	7-78	1
7-20	1	7-79	0
7-21	0	7-80	1
7-22	1	7-81	0
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7-28	1	7-83 thru 7-85	0
7-29	0	7-86	1
7-30	1	7-87 and 7-88	0
7-31	0	7-89	1
7-32	1	7-90	0
7-33	0	7-91	1
7-34	1	7-92 and 7-93	0
7-35	0	7-94	1
7-36	1	7-95 thru 7-97	0
7-37 thru 7-39	0	7-98	1
7-40	1	7-99 thru 7-103	0
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Technical Manual)
)
No. 43-0001-28)

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 28 April 1994

ARMY AMMUNITION DATA SHEETS FOR ARTILLERY AMMUNITION: GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES, GRENADE LAUNCHERS AND ARTILLERY FUZES (Federal Supply Class, 1310, 1315, 1320, 1390)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. You may mail, e-mail, or FAX your response. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army TACOM, Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-LSB, Picatinny Arsenal, NJ 07806-5000. E-mail address is LSB@PICA.ARMY.MIL. FAX number is Commercial (201) 724-4633, DSN 880-4633. A reply will be furnished to you.

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*This manual supersedes TM 43-0001-28, 25 April 1977, including all changes.

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CHAPTER 1
INTRODUCTION

1.1. PURPOSE

This manual is a reference handbook published as an aid in planning, training, familiarization and identification of artillery ammunition, including guns, howitzers, recoilless rifles, mortars, 50mm grenade launchers, and artillery fuzes.

1-2. SCOPE

a. For each item of materiel, there are illustrations and descriptions together with characteristics and related data. Included in the related data are weight, dimensions, performance data, packing, shipping and storage data, type classification, and logistics control code (LCC).

b. Information concerning supply operation, and maintenance of the items will be found in the publications referenced for those items. A complete listing of these publications is maintained in DA Pam 310 series indexes.

c. Appendix A and TM 43-0001-28-4 through TM 43-0001-28-10 list authorized Cartridge/Projectile Fuze and Propelling Charge Combinations. These lists (i.e., charts) supersede the fuze and propelling charge combinations referenced on the data sheets.

d. Within this manual, items with the following type classifications are included:

(1) Standard (LCC-A, LCC-B)

(2) Contingency (CON)

(3) Limited Procurement (LP)

(4) Reclassified obsolete (OBS) for regular Army use, but used by National Guard or Reserve Units.

(5) Reclassified OBS for all Army use, but used by Marine Corps, Air Force, or Navy

(6) Reclassified OBS, no users, but U.S. stocks remain.

Items with the following type classification are not included: Reclassified OBS for all U.S. use. No U.S. stocks remain. (Foreign use or stock may remain.)

f. Numerical values, such as weights, dimensions, candlepower, etc., are nominal values, except when specified as maximum or minimum. Actual items may vary slightly from these values. Allowable limits can be obtained from the drawings indicated in the data sheets.

1-3. KEY TO ABBREVIATIONS AND SYMBOLS

AP ---------- Armor piercing
APC ---------- Armor piercing capped
APDS ---------- Armor piercing, discarding sabot
APERS ---------- Antipersonnel
AT ---------- Antitank
BD ---------- Base detonating
BE ---------- Base ejection
CS ---------- A tactical riot control agent
DS ---------- Discarding sabot
GB ..... Nonpersistent toxic (casualty) nerve gas
H ---------- Mustard gas
HC ---------- Hexachloroethane-zinc
HD ---------- Distilled mustard gas
HE ---------- High explosive
HT ---------- Mixture of HD&T
HEAT ---------- High explosive antitank
HEAT-T-MP ---- High explosive antitank with tracer, multipurpose
HEDP ---------- High explosive dual purpose
HEI ---------- High explosive incendiary
HEP ---------- High explosive plastic
HERA ---------- High explosive rocket assisted
HVAP ---------- Hypervelocity, armor piercing
HVTP ---------- Hypervelocity, target practice
ILLUM ---------- Illuminating
LCC ---------- Logistics Control Code (class)
MOD ---------- Modified
MK ---------- Mark
MP ..... Multipurpose
MT ---------- Mechanical time
MTSQ ---------- Mechanical time and superquick
MV ---------- Muzzle velocity
PD ---------- Point detonating
PIBD ---------- Point initiating, base detonating
PROX ---------- Proximity
PWP ..... plasticized white phosphorous
RAP ---------- Rocket assisted projectile

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S&A ---------- Safe and Arming
SD ---------- Self destroying
T ---------- Time fuse or for training only
-T ---------- With tracer
TP ---------- Target practice
TSQ ---------- Time superquick
UNO ---------- United Nations Organization
VX ---------- Persistent toxic (casualty) nerve gas
WP ---------- White phosphorous

1-4. METRIC CONVERSION CHART

For approximate conversions to/from metric measures see table 1-1.

Table 1-1. Metric Conversion Chart

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
in.	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	WEIGHT			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lbs)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3

TEMPERATURE

Symbol	When You Know	Subtract	Multiply by	To Find	Symbol
°F	Fahrenheit	32	0.55	Celsius	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in.
cm	centimeters	0.4	inches	in.
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000m^2)	2.5	acres	
	WEIGHT			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3

TEMPERATURE

Symbol	When You Know	Subtract	Multiply by	To Find	Symbol
°C	Celsius	1.8	32	Fahrenheit	°F

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1-5. QUANTITY-DISTANCE CLASSES AND STORAGE COMPATIBILITY GROUPS

Quantity-Distance (QD) classes and Storage Compatibility Groups (SCG) listed in this manual are changed. For conversion to new system see table 1-2.

Table 1-2. Quantity-Distance Classes and Storage Compatibility Groups

Quantity-distance hazard class 1/		Storage compatibility group 1/3/
Old	New 2/	Typical - New
8	6.1	
7	1.1	D
6	1.2(18)	E
5	1.2(12)	
4	1.2(08)	F
3	1.2(04)	G
2	1.3	C
1	1.4	S

Notes:

1/ New QD and SCG'S are compatible with classes used by NATO nations.

2/ Numbers in parentheses are minimum distances x 100 feet to protect against specific fragment hazards and vary with items and types of ammunition. (Refer to TM 9-1300 -206.)

3/ There is no simple conversion from old SCG's to new system. The SCG groups listed in this column are typical for the majority of items in the corresponding listed QD class but do not apply to every individual item in the class. For SCG of individual items refer to TM 9-1300-206.

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CHAPTER 2

ARTILLERY AMMUNITION

FOR

GUNS

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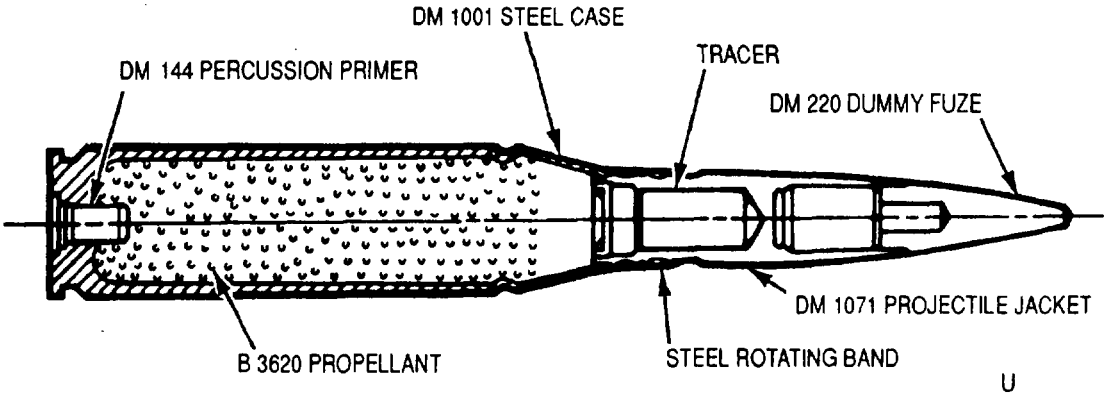
CARTRIDGE, 35 MILLIMETER: TP-T M968 WITH IGNITOR, ELECTRIC, M63



Type Classification:

LPU, 30 May 88.

Use:

The M968 cartridge and the M63 igniter are assembled to the cartridge adaptor component of the weapon system. See Mauser Tank Precision Gunnery Inbore Device (TPGID) Operator's Manual for loading sequence. The M968 cartridge is a target practice round for use in the 35mm TPGID system, which is mounted inside the 120mm smooth bore M256 cannon. It is designed to simulate the flight characteristics of the M830 and M831 rounds out to 1,800 meters.

Description:

Cartridge M968. The projectile consists of a DM1071 projectile jacket, a DM220 dummy point-detonating fuze, a tracer, and a press-seated steel rotating band. The projectile is crimped to a DM1001 steel cartridge case, which holds approximately 0.69 pound (0.31 kg) of B3620 single-base propellant and is fitted with a DM144 percussion primer.

Ignitor M63. The M63 igniter consists of a closing plug assembly, an igniter body assembly and an ignitor element assembly. The ignitor element assembly is loaded with approximately 0.006 ounce (0.17 g) of igniter material (40% Potassium Chlorate, 32% Lead Thiocynate, 18% Charcoal, and 10% Egyptian Lacquer) and is assembled to the ignitor body. The closing plug assembly contains approximately 0.007 ounce (0.198 g) of black powder and is also assembled to the igniter body.

Functioning:

The TPGID cartridge adaptor is loaded into the 120mm smooth bore cannon in the normal manner. Upon initiation of the M63 igniter in the weapon, gases from the igniter force the piston/firing pin mechanism to strike the percussion primer of the M968. Functioning of the percussion primer initiates the B3620 propellant. The resulting gases drive the projectile from the gun and ignite the tracer. The projectile is spin stabilized during its flight to target.

Tabulated Data:

M968 Cartridge.

Type classification	LPU, 30 May 88
Complete round:	
Type	Fixed, TP-T
Length	15.24 in. (38.71 Cm)
Weight	3.46 lb (1.57 kg)
Cannon used with	35mm TPGID system mounted to 120mm smooth bore M256 cannon
Assembly drawing	12910291
Color	Blue w/white marking on projectile

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Temperature limits:
- Firing:
  - Lower limit ---------- -25°F (31.7°C)
  - Upper limit ---------- (+37.8°C)
- Storage:
  - Lower limit ---------- -25°F (-31.7ºC)
  - Upper limit ---------- +125°F (+51.7ºC)

Packaging:
- Packing and marking drawing ---------- 12910292
- *Packing ---------- 2 rounds per styrofoam pack; 8 styrofoam packs per metal container; 10 metal containers per pallet

Metal container:
- Weight (w/ammo) ---------- 99 1b (45 kg)
- Dimensions ---------- 27.1 in. L x 7.8 in. W x 7.8 in. H (68.9 cm L x 19.8 cm W x 19.8 cm H)
- Cube ---------- 0.96 cu ft (0.03 cu m)

M63 Ignitor.

Type classification ---------- N/A

Complete round:
- Type ---------- Ignitor, electric
- Length ---------- 1.72 in. (4.37 cm)
- Weight ---------- 1.68 oz (47.63 g)
- Cannon used with ---------- 35mm TPGID system mounted to 120mn smooth bore M256 cannon
- Assembly drawing---------- 8839497
- Color ---------- Brass with black marking

Temperature limits:
- Firing:
  - Lower limit ---------- -25°F (-31.7°C)
  - Upper limit ---------- +100°F (+37.8°C)
- Storage:
  - Lower limit ---------- -25°F (-31.7°C)
  - Upper limit ---------- +125°F (+51.7°C)

Packaging:
- Inner packing drawing ------- 8837898
- Outer packing drawing ------- 8837897
- *Packing ---------- 50 igniters per carton; 9 cartons per box

Box container:
- Weight ---------- 75 lb (34 kg)
- Dimensions ---------- 15 in. L x 9.375 in. W x 7.44 in. H (38 cm L x 23.813 cm W x 18.9 cm H)
- Cube ---------- 0.7 cu ft (0.02 cm)

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

M968 Cartridge.

UNO serial number ---------- 0339
DOT hazard class ---------- (08) 1.4C
DOD storage comparability group ---------- C
DOT designation ---------- AMMUNITION FOR CANNON W/SOLID PROJECTILE, CLASS C EXPLOSIVE
DODAC ---------- 1310-B591

M63 Ignitor.

DOT hazard class ---------- (04) 1.2 C
DOD storage compatibility group ---------- G
DOT designation ---------- CANNON PRIMER - HANDLE CAREFULLY
DODAC ---------- 1305-N700

NOTE

Only the M968 is to be fired from the 35mm TPGID system.

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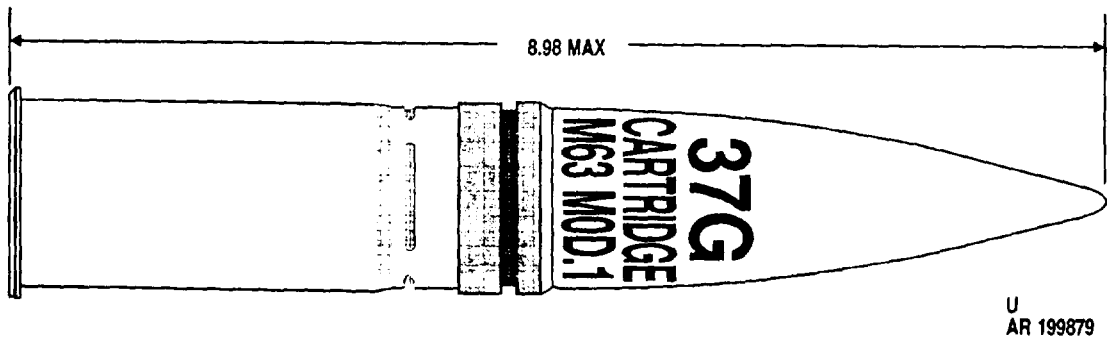
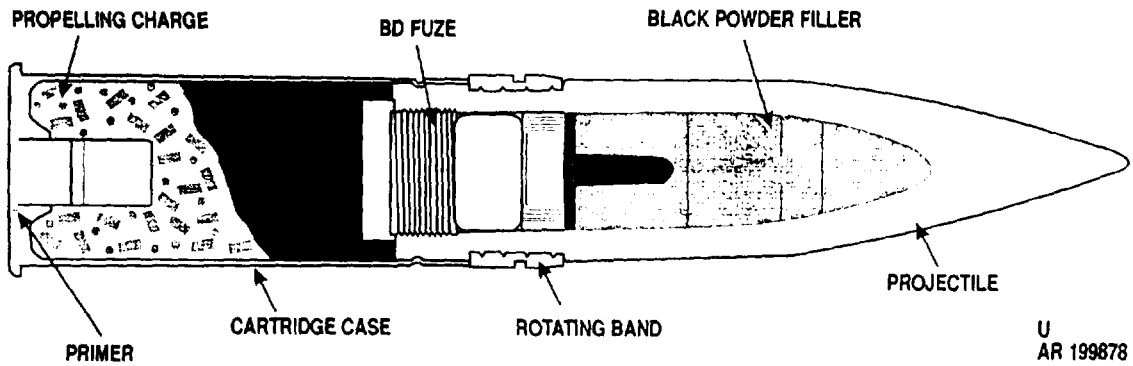
CARTRIDGE, 37 MILLIMETER: TP, M63, MOD 1





Type Classification:

STD OTCM 37119 dtd 1959.

Use:

This target practice cartridge is used in subcaliber 37mm guns fitted to larger weapons for practice firing and training.

Description:

The cartridge consists of a black powder-filled steel projectile crimped to a steel cartridge case and fitted with a base-detonating practice fuze. A rotating band encircles the projectile near the base. The cartridge case is loosely filled with propellant and is fitted with a percussion primer.

Functioning:

When the weapon is fired, the firing pin strikes the primer to ignite the propelling charge. The rotating band engages the barrel rifling to impart spin to the projectile and prevent escape of pressure past the projectile. Rapidly expanding gases from the burning propellant drive the projectile through the barrel with the velocity required to reach the target. Upon impact, the base-detonating fuze ignites the black powder filler in the projectile, simulating the detonation of a service projectile.

Tabulated Data:

Complete round:

Type	TP
Weight	2.01 lb
Length	8.98 in.
Cannon used with	M12, M13, M14, M15, M1916

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Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white markings (and brown band for later manufacture)
- Filler and weight ---------- Black powder,
- Fuze ---------- M58

Propelling charge:
- Cartridge case ---------- MK1A2, MK1A2B1
- Propellant ---------- M2, 0.56 lb
- Primer ---------- M23A2 percussion

Performance:
- Maximum range ---------- 4459 m (4980 yd)
- Muzzle velocity ---------- 328 mps (1100 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 20 containers per wooden box

* Packing box:
- Weight ---------- 60.5 lb
- Dimensions ---------- 23-11/16 x 11-7/16 x 6-19/32 in.
- cube ---------- 1 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ---------- 4
Storage compatibility group--- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1310-B526
Drawing number ---------- 8831141

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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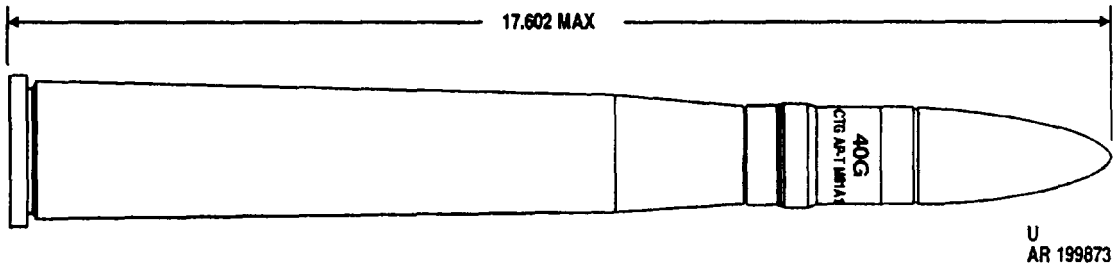
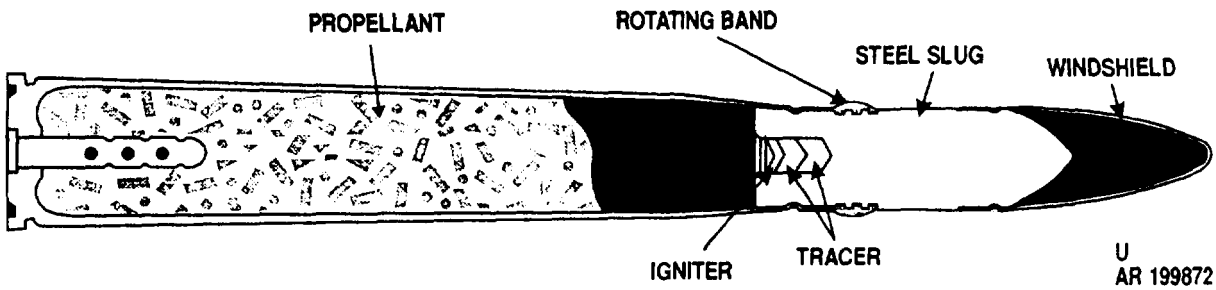
CARTRIDGE, 40 MILLIMETE: AP-T, M81A1 AND M81





Type Classification:

CONT AMCTC 6418 dtd 1968.

Use:

This fixed ammunition is used in 40mm gun cannons for firing at armored and other protected targets.

Description:

The projectile for the M81A1 cartridge consists of a hardened steel monobloc slug, crimp-fitted on the blunt ogival nose with a thin steel, streamlined windshield cap to reduce aerodynamic drag. A tracer element in the base of the projectile provides a visible trace for approximately 12 seconds. In addition, some lots of these cartridges are coated on the windshield with a compound designed to leave a vapor trail for about 1,000 yards. Such lots are intended for training only and not for use in combat except for emergency. A rotating band encircles the projectile near the base. A brass or steel cartridge case filled with loose propellant is crimped to the projectile. The case has an extractor rim base, and the base contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the primer, the black powder in the primer tube is ignited. Sparks flash through the tube perforations to ignite the propelling charge, and the burning propelling charge drives the projectile through the barrel with the velocity required to reach the target. Upon impact, the thin windshield crumbles, but the hardened steel slug penetrates the armor of the target.

Difference Between Models:

The windshield on the M81 is attached with an adapter rather than by crimping, and a different model primer is used.

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Tabulated Data:

Complete round:
- Type ---------- AP-T
- Weight ---------- 4.58 lb
- Length ---------- 17.6 in.
- Cannon used with ---------- M1 series, M2 series, MK1 (Navy)

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/white markings

Components:
- Tracer and weight ---------- Red, 0.02 lb

Propelling charge:
- Cartridge case ---------- M25, M25B1
- Propellant and weight -------- Ml, 0.65 lb
- Primer ---------- M23A2, M38A1, M38B2 or MK22

Performance:
- Maximum range ---------- 8779 m (9600 yd)
- Muzzle velocity ---------- 872 mps (2870 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +l60°F (for period not more than 4 hr/day)

*Packing ---------- 1 per fiber container; 8 containers per wooden box

*Packing box:
- Weight ---------- 59 lb
- Dimensions ---------- 21-11/16 x 7-31/32 x 12-9/16 in.
- Cube ---------- 1.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group --- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1310 -B552
Drawing number ---------- 75-1-140

References:

AMC-P 700-3-3
SB 700-20

TM 9-1300-251-20

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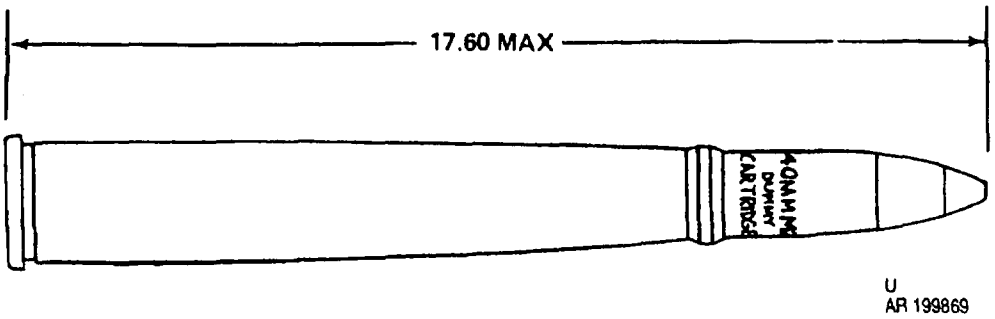
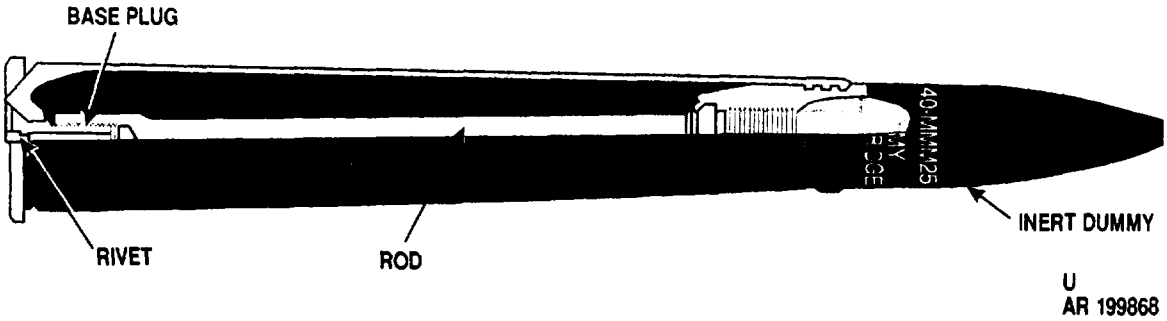
CARTRIDGE, 40 MILLIMETER: DUMMY, M25





Type Classification:

STD OTCM 36841 dtd 1958.

Use:

This dummy cartridge is used in 40mm guns to simulate firings and to train personnel in ammunition handling and loading the weapon.

Description:

The cartridge consists of a modified service projectile and a modified cartridge case. The projectile is inert and is fitted with a dummy nose fuze. The cartridge case has a base plug in place of a primer, and a copper rivet is centered in the base plug to avoid damage to the firing pin of the weapon. The projectile and case are held together by a steel retaining rod extending through the case. One end of the rod is threaded into the tracer cavity in the dummy projectile and the other end has an internally threaded socket to fit the base plug of the cartridge case.

Functioning

The dummy cartridge is completely inert and nonfunctioning.

Tabulated Data:

Complete round:
- Type ---------- Dummy
- Weight ---------- 4.75 lb
- Length ---------- 17.6 in.
- Cannon used with ---------- M1 series, M2 series, MK1 (Navy)

Projectile:
- Body material ---------- Steel
- Color:
  - Old ---------- Black w/white markings
  - New---------- Bronze w/white markings

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Fuze	Dummy, M69 or M69B1
Cartridge case	M25B1 modified
*Packing	1 cartridge per fiber container; 8 containers per wooden box
*Packing box:	
Weight	59 1b
Dimensions	21-1 1/16 x 7-3 1/32 x 12-9/16 in.
Cube	1.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	DRILL CARTRIDGE (INERT)
DODAC	1310-B565
Drawing number	72-3-101

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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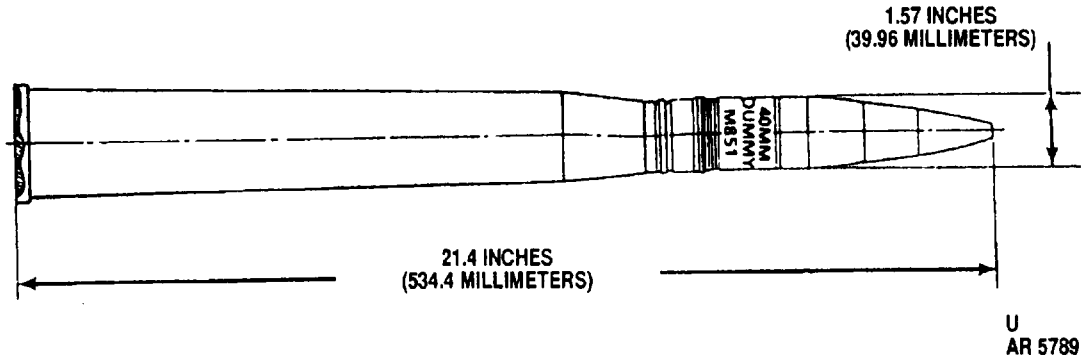
CARTRIDGE, 40 MILLIMETER: DUMMY, M851 (FOR SGT YORK)



Type Classification:

STD LEC-A MSR 05826003.

Use:

This completely inert round is used to train personnel to load and unload the Sgt York 40mm gun M247.

Description:

The dummy cartridge is completely inert and is machined from a solid aluminum alloy bar.

Functioning:

The dummy cartridge is nonfunctioning and cannot be fired.

Tabulated Data:

Complete round:

Type	Dummy
Weight	5.5 lb (2.42 kg)
Length	21.04 in. (534.4 mm)
Color	Bronze metal colored w/white markings

*Packing box:

Weight	1500 lb
Dimensions	28 in. (71.12 cm) x 56.3 in. (143 cm) x 43.1 in. (109.47 cm)
Cube	38.9 cu ft (1.08 cu m)

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	DRILL CARTRIDGE/ INERT
DODAC	1310-B583
Drawing number	12600005

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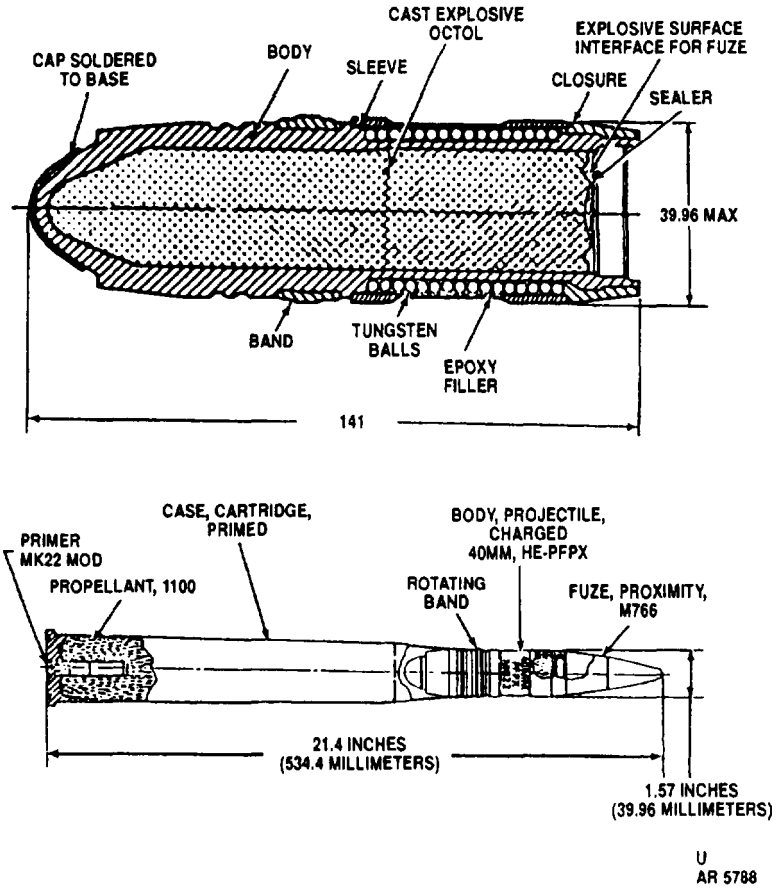
CARTRIDGE, 40 MILLIMETER: HE M822 WITH FUZE PROXIMITY, M766 (FOR SGT YORK)



Type Classification:

STD MSR 05826003.

Use:

This cartridge with the proximity fuze is primarily used against low flying aircraft. It is fired from the Sgt York 40mm gun M247.

Description:

The projectile of this cartridge is made of alloy steel with tungsten pre-fragmented spheres. It is filled with Octol (120 g). This projectile is designed to fragment and disburse tungsten spheres upon detonation of explosive charge. The cartridge is brass and crimped to the projectile. The cartridge case contains approximately 500 grams of propellant. The base of the cartridge case contains a percussion primer containing black powder and a percussion element. The color of the projectile body is painted yellow with black markings. The projectile nose is threaded to receive the proximity fuze. The M766 proximity fuze is radar controlled and functions either upon target impact or when in close proximity to the target.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. This causes the rapidly expanding gases, generated by the burning propellant, to propel the projectile toward the target. Upon approaching or impacting the target, the proximity fuze detonates the Octol causing the projectile to burst and disburse the tungsten spheres and other fragments.

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Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 5.5 lb (2490 g)
- Length ---------- 21 in. (534 mm)
- Cannon used ---------- M266

Projectile:
- Body material ---------- Alloy steel w/tungsten pre-fragmented spheres
- Color ---------- Yellow body w/ black markings
- Filler and weight ---------- Octol, 120 g

Components:
- Tracer ---------- N/A
- Fuze ---------- M766 proximity
- Cartridge case ---------- Brass
- Propellant and weight -------- Single base, single perforated, 515 g
- Primer ---------- MK22

Performance:
- Muzzle velocity ---------- 1100 mps

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +140°F (+60°C)
- Storage:
  - Lower limit ---------- -80°F (-62°C) (for period not more than 3 days)
  - Upper limit ---------- +160°F (+71°C) (for period not more than 4 hr/day)
- *Packing ---------- 192 cartridges per box; 48 clips, 4 rounds per clip

*Packing box:
- Weight (empty) ---------- 242 lb
- Weight (loaded)---------- 1500 lb
- Dimensions ---------- 56.3 x 43.1 x 28 in.
- cube ---------- 39.9 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (0.4) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT description ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1310-B518
Drawing number ---------- 12600002

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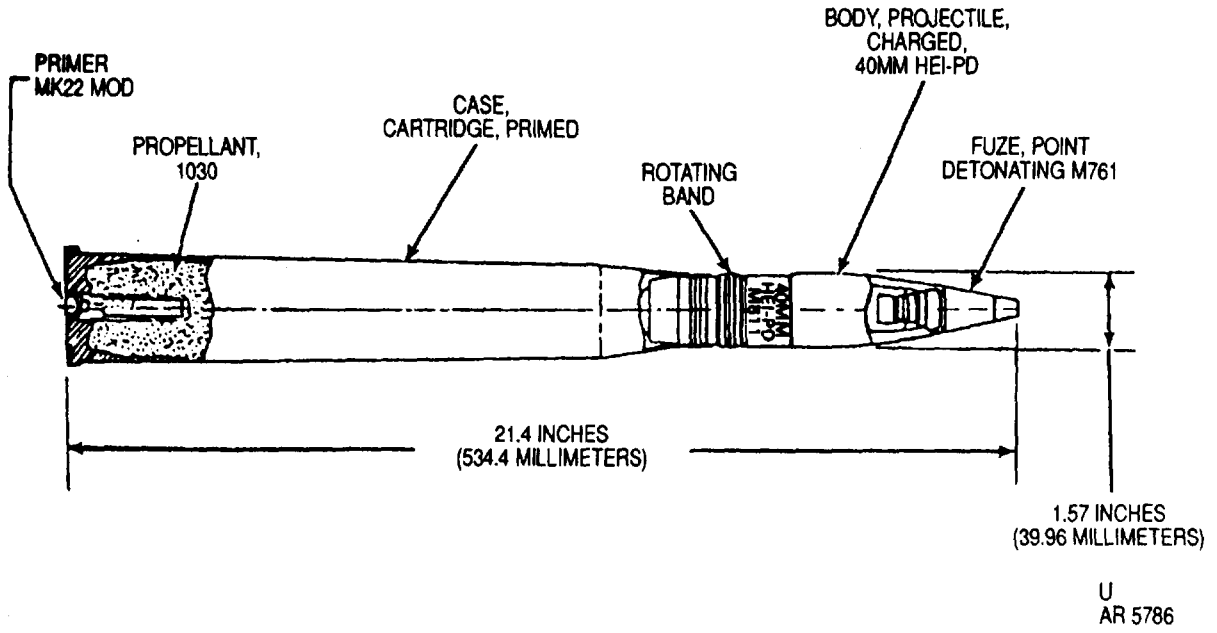
CARTRIDGE, 40 MILLIMETER: HEI M811 WITH POINT-DETONATING FUZE M761 (FOR SGT YORK)



Type Classification:

STD MSR 05826003.

Use:

This cartridge is used against low flying aircraft and also ground targets. It is fired from the Sgt York 40mm gun 247.

Description:

The projectile of this cartridge is high-explosive incendiary with a point-detonating delay action fuze. The projectile is alloy steel filled with Octol (165 g). The projectile nose is threaded to receive the fuze. The cartridge case is brass and crimped rigidly to the projectile. The cartridge case contains approximately 500 grams of propellant. The base of the cartridge case contains a percussion primer consisting of a perforated tube containing black powder and a percussion element. The color of the projectile body is painted yellow with black markings and a light red band. The M761D point-detonating fuze has a delay action module, is graze sensitive, and is self-destructing.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. The rapidly expanding gases generated by the burning propellant propels the projectile. Upon impact, the target fuze detonates the high-explosive incendiary charge of the projectile.

Tabulated Data:

Complete round:	
Type	HEI
Weight	5.5 lb (2490 g)
Length	21 in. (534 mm)
Cannon used	M266
Projectile:	
Body material	Alloy steel
Color	Yellow body w/black markings; 1 light red band
Filler and weight	Octol, 165 g
Components:	
Tracer	N/A
Faze	M761 PD (delay)

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Components (cont):
- Cartridge case ---------- Brass
- Propellant and weight -------- Single base, single perforated, 500 g

Performance:
- Muzzle velocity ---------- 1100 mps

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +140°F (+60°C)
- Storage:
  - Lower limit ---------- -80°F (-62°C) (for period not more than 3 days)
  - Upper limit ---------- +160°F (+71°C) (for period not more than 4 hr/day)

*Packing ---------- 192 cartridges per metal shipping container; 48 clips, 4 rounds per clip

*Packing box:
- Weight (emply)---------- 242 lb
- Weight (loaded) ---------- 1500 lb
- Dimensions ---------- 56.3 x 43.1 x 28 in.
- cube ---------- 38.9 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (04) 1.2
Storage compatibility group--- E
DOT shipping class ---------- A
DOT description ---------- AMMUNITION FOR CANNON WITH EXPLOSIVES
DODAC ---------- 1310-B517
Drawing number ---------- 12600009

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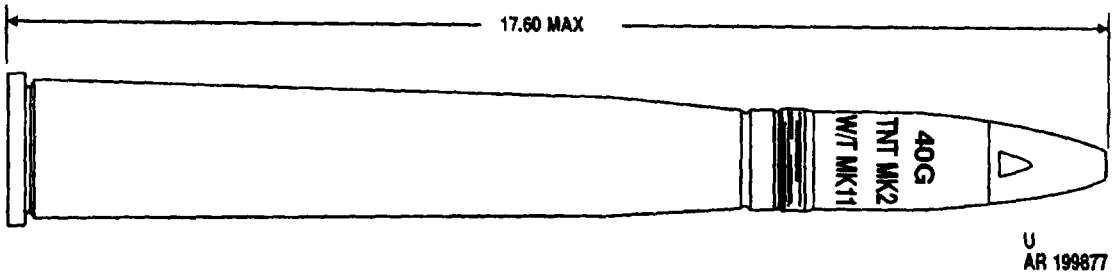
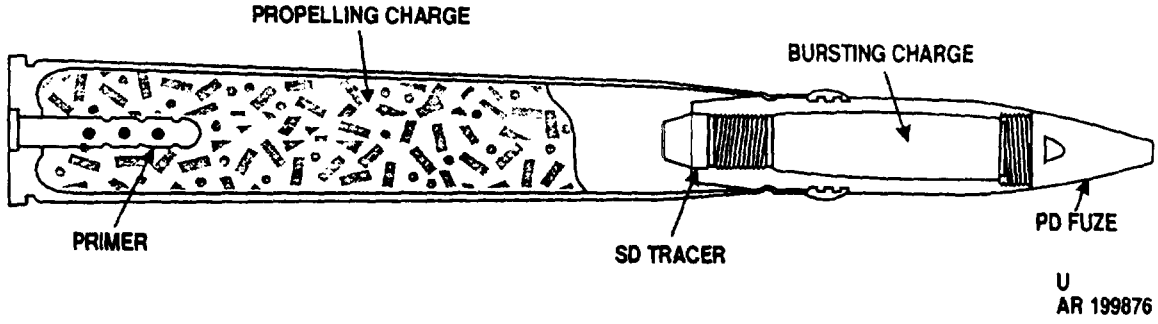
CARTRIDGE, 40 MILLIMETER: HE-T, SD, MK11, MK2, MV2870 AND SD, M3 OR M3A1, MV2700





Type Classification:

STD OTCM 36841 dtd 1958 (MK2 only, CON MSR 11756003).

Use:

This cartridge is used in 40mm gun cannons for firing against materiel.

Description

The thin-walled projectile contains a TNT bursting charge, a point-detonating fuze, and a self-destroying tracer. The projectile nose is internally threaded to receive the fuze. The boat-tailed base has a self-destroying tracer assembly threaded internally. The assembly protruding approximately 0.6 inch from the base, contains an igniting charge, a tracer composition, and a relay igniting charge of black powder. The projectile is assembled with either a brass or steel cartridge case containing a percussion primer that is crimped to the projectile by means of a 360° crimp. This cartridge provides a muzzle velocity of 2,870 feet per second.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant, which, in turn, imparts velocity to the projectile and ignites the tracer. The high-explosive bursting charge is detonated by either the fuze functioning or the tracer relay igniting charge, depending upon whether contact with a target or the burning out of the tracer occurs first. The tracer composition burns with a visible trace for 8 to 10 seconds.

Difference Between Models:

The MV2700 is similar except the tracer is M3 or M3A1 and the projectile is loaded with tetryl.

Tabulated Data:

Complete round:

Type	HE-T, SD
Weight	4.75 lb
Length	17.6 in.

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Complete round (cont):

Cannon used with	M1 series, M2 series or MK1 (Navy)
Projectile:	
Body material	Steel
Color:	
Army mfg	Olive drab w/yellow markings
Navy mfg	Green w/white markings and green tip fuze
Filler and weight	TNT or Tetryl, 0.14 lb
Components:	
Cartridge case	M25, M25B1
Propelling charge	M1 propellant, 0.72 lb
Primer	M38, M38B2 or M K 2
Tracer	MK11, MK11 Mod 2; M3, M3A1-Red
Bursting charge	Pressed TNT
Faze	PD-MK27 (M3 or M3A1) M27, M71 (MK11, MK11 Mod 2)
Performance:	
Maximum range	SD, MK2 (2870 fps): 4300 yd (tracer burn-out); SD, MK2 (2700 fps): 5700 yd (tracer burn-out)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more an 3 days)
Upper limit	+ 160°F (for period not more than 4 hr/day)
*Packing (Navy)	4 cartridges per charger clip; 4 clips (16 car-tridges) per metal box
*Packing box (Navy):	
Weight	110 lb
Dimensions	22 x 11-3/4 x 11-3/4 in.
Cube	1.7 cu ft
*Packing (Army)	1 round per fiber container; 8 containers per wooden box
*Packing box (Army):	
Weight	59 lb
Dimensions	21-11/15 x 12-9/16 x 7-31/32 in.
Cube	1.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shippng class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B562
Drawing number	75-1-166

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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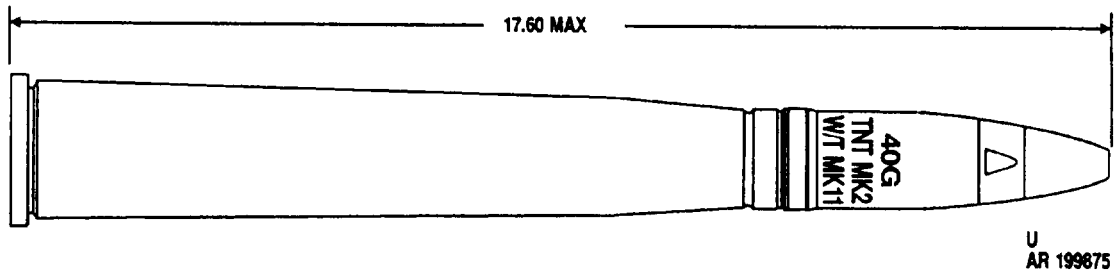
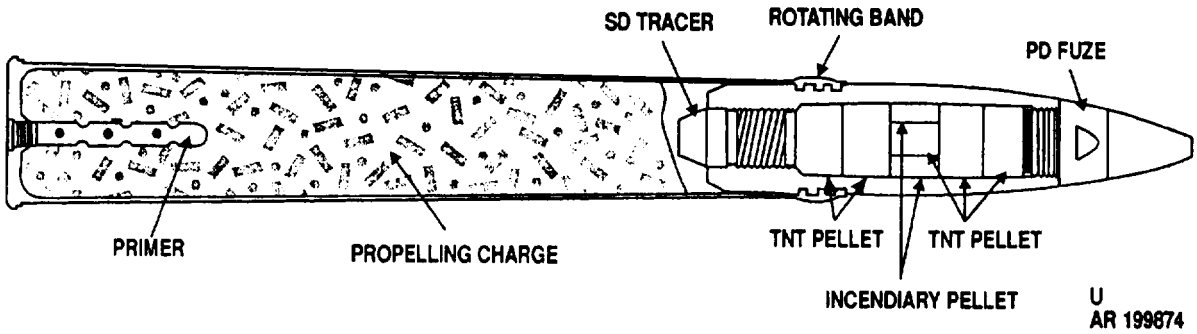
CARTRIDGE, 40 MILLIMETER: HEI-T, SD, MK11, MK2, MV2890





Type Classification:

STD OTCM 37119 dtd 1959 (MK2 only, CON MSR 11756003).

Use:

This fixed ammunition is used in 40mm gun cannons for firing against materiel.

Description:

The relatively thin-walled projectile contains a burster charge, an incendiary charge, a point-detonating fuze, and a self-destroying (SD) tracer. The projectile nose is threaded to receive the fuze. The SD tracer assembly is contained in the boat-tailed base of the projectile, which is internally threaded, and it extends approximately 0.6 inch beyond the base. The SD tracer consists of an igniting charge, a red tracer composition, and a relay igniting charge. The cartridge case, either brass or steel, is crimped rigidly to the projectile by means of a 360° crimp. The base of the cartridge case contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant charge to impart velocity to the projectile and to ignite the tracer. The high-explosive bursting charge is detonated either by the fuze upon contact with the target or by the tracer relay igniting charge. The tracer composition burns with a visible trace for 8 to 10 seconds.

Difference Between Models:

Cartridges manufactured by the Navy may be distinguished by the painting on the fuzes. The fuze for the Navy HEI-T cartridge is painted red and white (red tip on fuze).

Tabulated Data:

Complete round:

Type	HEI-T, SD
Weight	4.75 lb
Length	17.6 in.
Cannon used with	M1 series, M2 series, MK1 (Navy)

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Projectile:
- Body material ---------- Steel
- Color:
  - Army mfg---------- Olive drab w/yellow marking
  - Navy mfg ---------- Green w/black band
- Filler and weight ---------- TNT, 0.14 lb (tracer incendiary charge, 36 gr)

Components:
- Cartridge case ---------- MK2, MK2 Mod, or MK3
- Tracer ---------- MK11, MK11 Mods
- Tracer charge ---------- Igniting charge, a red tracer composition, and a relay igniting charge of black powder
- Faze ---------- PD, MK27
- Propelling charge ---------- M1 propellant, 0.72 lb
- Primer ---------- MK22, M38A1, M38B2
- Burster charge ---------- TNT powder and incendiary charge

Performance:
- Maximum range ---------- 3932 m (4300 yd)
- Muzzle velocity ---------- 879 mps (2890 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing (Navy)---------- 4 cartridges in charger clip; 4 charger clips in metal box

*Packing box:
- Weight ---------- 110 lb
- Dimensions ---------- 22 x 11.75 x 11.75 in.
- Cube ---------- 1.7 cu ft

*Packing (Army) ---------- 1 cartridge in fiber container; 8 containers in wooden box

*Packing box:
- Weight ---------- 59 lb
- Dimensions ---------- 21-11/16 x 7-31/32 x 12-9/16 in.
- Cube ---------- I.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (08) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1310-B559
Drawing number ---------- 75-1-166

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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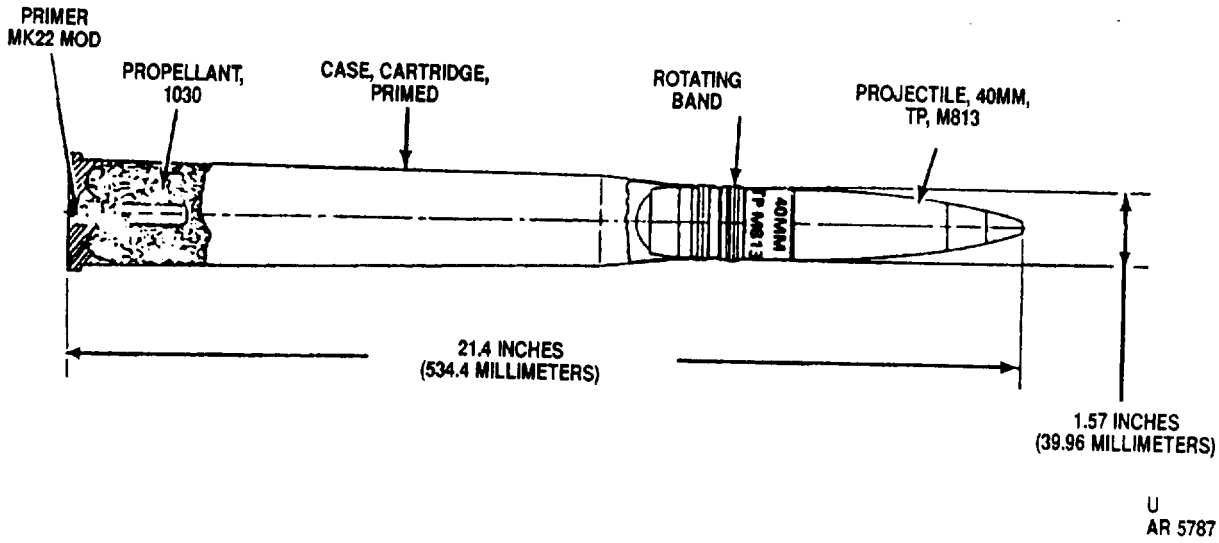
CARTRIDGE; 40 MILLIMETER: TP, M813 (SGT YORK)



Type Classification:

STD MSR 05826003.

Use:

This fixed cartridge is used for target practice in the Sgt York 40mm gun M247.

Description:

The projectile is filled with inert material and simulates the DIVAD combat round (HE M811). A rotating band encircles the projectile near the base where the projectile is assembled into the cartridge case. The projectile is painted blue with white markings. The cartridge case is brass and crimped to the projectile. The cartridge case contains approximately 515 grams of propellant. The base of the case forms an extractor rim and contains a percussion primer.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. This causes rapidly expanding gases, generated by the burning propellant, to propel the projectile toward the target. The inert projectile does not detonate on impact.

Tabulated Data:

Complete round:
- Type ---------- TP
- Weight ---------- 5.5 lb (2490 g)
- Length ---------- 21 in (534 mm)
- Cannon used ---------- M266

Projectile:
- Body material ---------- Carbon steel
- Color ---------- Blue w/white markings
- Filler ---------- Inert material

Components:
- Tracer ---------- N/A
- Fuze ---------- N/A
- Cartridge case ---------- Brass
- propellant and weight -------- Single base, single perforated, 515 g
- Primer ---------- MK22

Performance:
- Muzzle velocity ---------- 1100 mps

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Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +140°F (+60°C)
- Storage:
  - Lower limit ---------- -80°F (-62°C) (for period not more than 3 days)
  - Upper limit ---------- +160°F (+71°C) (for period not more than 4 hr/day)

*Packing ---------- 192 cartridges per box, 16 rounds per layer; 48 clips, 4 rounds per clip

*Packing Box:
- Weight (empty) ---------- 242 lb
- Weight (loaded) ---------- 1500 lb
- Dimensions ---------- 56.3 x 43.1 x 28 in.
- Cube ---------- 38.9 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0417
Quantity-distance class --------- (02) 1.3
Storage compatibility group--- C
DOT shipping class ---------- B
DOT description ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILE
DODAC ---------- 1310-B511
Drawing number ---------- 12600003

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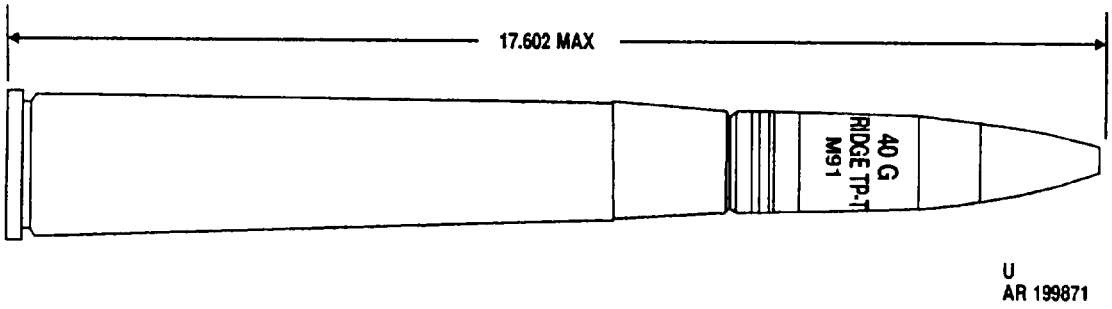
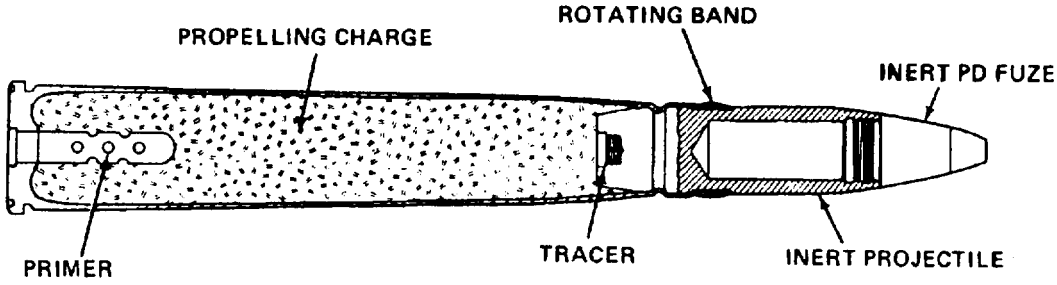
CARTRIDGE, 40 MILLIMETER: TP-T, M91





Type Classification:

CONT OTCM 37119 dtd 1959.

Use:

This fixed ammunition resembles the 40mm HE-T cartridge MK2 and is used for target practice in 40mm gun cannons.

Description:

The projectile, filled with an inert material, simulates the high-explosive service round. The base is fitted with a tracer, and an inert or dummy point-detonating fuze forms the nose. A rotating band encircles the projectile near the base where the projectile is assembled into the cartridge case. The cartridge case is crimped to the projectile and is filled with loose propellant. The base of the case forms an extractor rim and it contains a percussion primer which consists of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel to the velocity required to reach the target. The tracer composition burns for approximately 12 seconds, providing visibility of the trajectory The inert projectile does not detonate on impact.

Tabulated Data:

Complete round:

Type	TP-T
Weight	4.72 lb
Length	17.6 in.
Cannon used with	Ml series, M2 series, MK1 (Navy)

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Projectile:	
Body material	Steel
Color:	
Old	Blue or black w/white markings
New	Blue w/brown band and white markings
Filler	Inert material
Components:	
Tracer and weight	Red, 0.02 lb
Fuzes	Dummy, M69 or M69B1 Inert, M71 or MK27
Propelling charge:	
Cartridge case	M25, M25B1
Propellant and weight	M1, 0.721b
Primer	M38A1, M38B2, MK22
Performance:	
Maximum range	10,058 m (l1,000 yd)
Muzzle velocity	872 mps (2870 fps)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing (Navy)	4 cartridge per charger clip; 4 clips in metal box
*Packing box (Navy):	
Weight	111 lb
Dimensions	22 x 11.75 x 11.75 in.
cub	1.7 cu ft
*Packing (Army)	1 round per fiber container; 2 containers per wooden box
*Packing box (Army):	
Weight	59 lb
Dimensions	21-11/16 x 7-31/32 x 12-9/16 in.
cube	1.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILES
DODAC	1310-B564
Drawing number	75-1-173

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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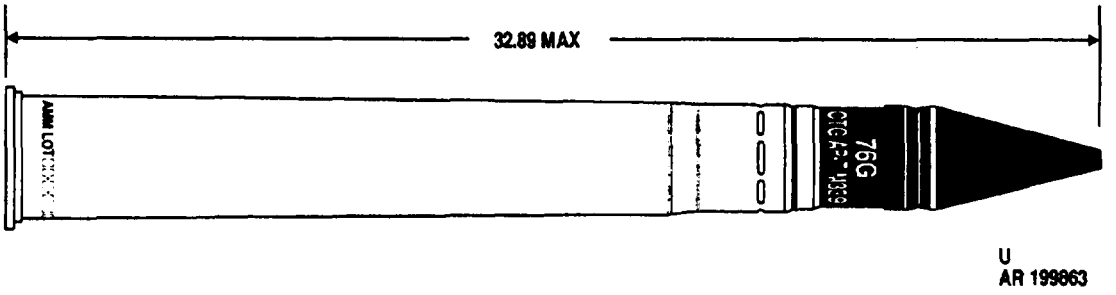
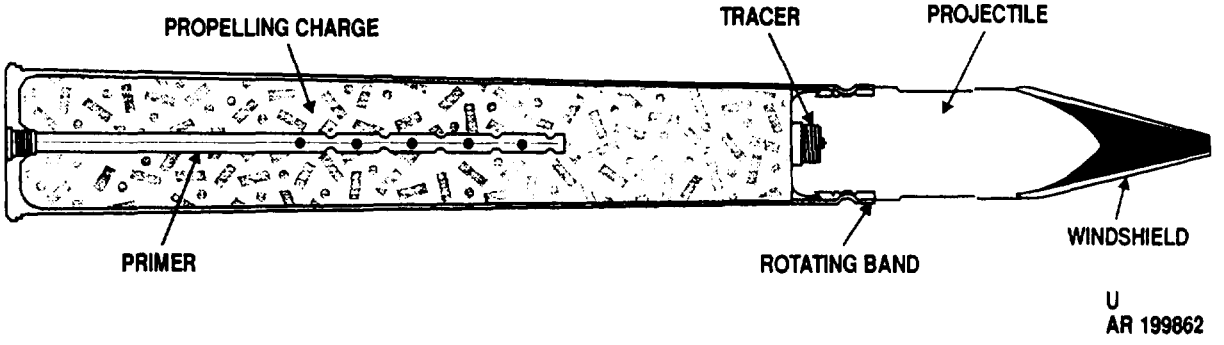
CARTRIDGE, 76 MILLIMETER: AP-T, M339





Type Classification:

OBS MSR 11756003.

Use:

This fixed cartridge is designed for use in 76mm guns against armored targets.

Description:

The solid tungsten carbide projectile is fitted with a lightweight windshield to provide a better ballistic shape. A tracer is located at the base of the projectile. The cartridge case, fitted with percussion primer and containing a triple-base propellant, is crimped to the projectile. A distinguishing characteristic of these rounds is the case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating ban and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant ignite the tracer and force the projectile from the gun barrel. The tracer provides a luminous red trace. Upon impact, the windshield breaks up and the tungsten carbide shot penetrates the armored target.

Tabulated Data:

Complete round:

Type	AP-T
Weight	27.32 lb
Length	32.89 in.
Cannon used with	M32 or M48

Projectile:

Body material	Steel/tungsten carbide
Color	Black w/white markings

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Components:
- Cartridge case ---------- M88 (brass); M88B1 (steel)
- Propelling charge ---------- M30, 5.6 lb
- Primer ---------- M58 percussion (400 gr black

- Tracer ---------- M13

Performance:
- Maximum range ---------- 14,704 m (16,419 yd)
- Muzzle velocity ---------- 954 mps (3200 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- **Storage:**
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 88 lb
- Dimensions ---------- 38-5/8 x 11-1/6 x 7-5/32 in.
- cube ---------- 1.8 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C120
Drawing number ---------- 8886612

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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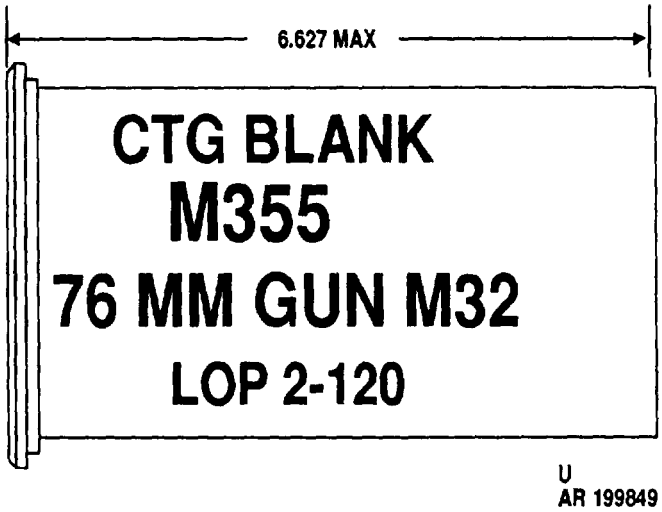
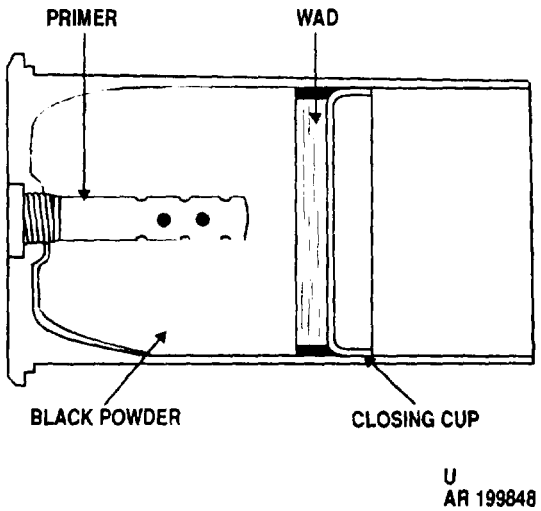
CARTRIDGE, 76 MILLIMETER: BLANK, M355A2





Type Classification:

OBS MSR 11756003.

Use:

This cartridge is used for salutes and simulated fire in 76mm guns.

Description:

The cartridge contains a charge of sodium nitrate black powder, loosely assembled in a primed brass or steel cartridge case. Slightly recessed in the mouth of the cartridge case is a plastic closing cup which retains the loose charge. Earlier models of this cartridge contain a bagged charge of potassium nitrate black powder.

Functioning:

When the primer is initiated by the firing pin of the weapon, the black powder charge is ignited producing a flash, smoke, and loud report.

Tabulated Data:

Complete round:

Type	Blank
Weight	4.33 lb
Length	6.627 in.
Cannon used with	M32, M48

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Components	
Body material	Brass or steel
Color	Blue or black w/white marking
Filler and weight	BP, 1 lb
Cartridge case	M101 (brass); M101B1 (steel)
Primer	M70percussion
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 8 containers per wooden box
*Packing box:	
Weight	58 lb
Dimensions	22-1/4 x 11-1/8 x 10 in.
Cube	1.43 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0327
Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC	1315-C131
Drawing number	7549267

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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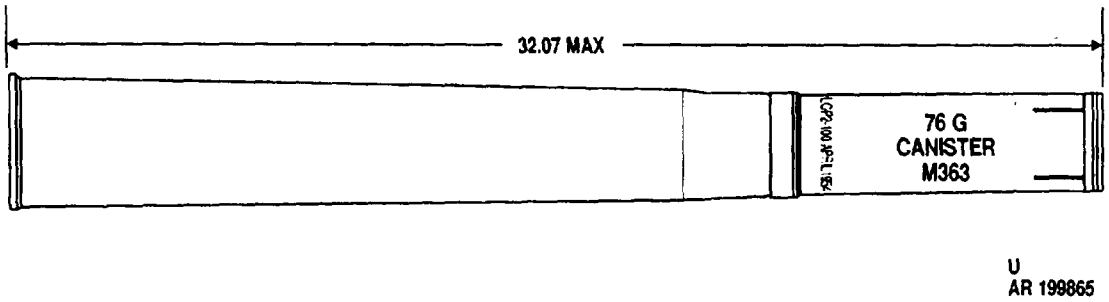
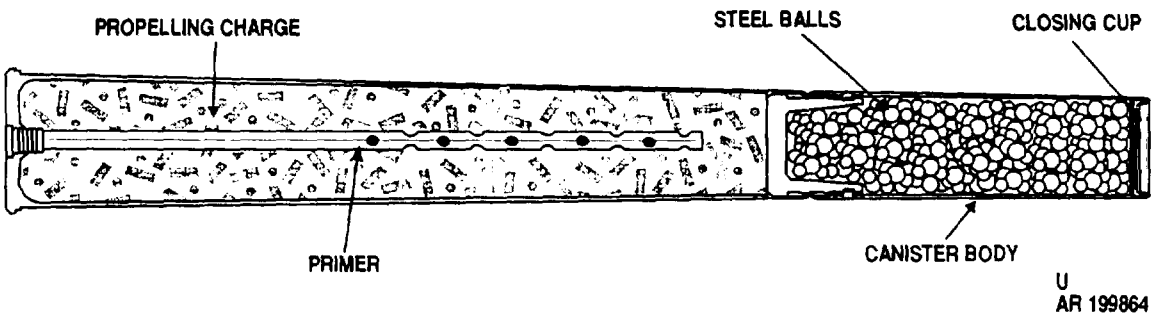
CARTRIDGE, 76 MILLIMETER: CANISTER, M363





Type Classification:

OBS MSR 11756003.

Use:

This fixed cartridge is intended for use in 76mm gun cannons against personnel at close range.

Description:

The canister has a heavy steel base and a lightweight body and is loaded with steel balls. The forward end is sealed with a closing cup. The canister body is distinguished by four equally spaced longitudinal slits in the lightweight body construction. The canister body is assembled to a brass or steel cartridge case, loaded with a single-base propellant, and fitted with a percussion primer. A distinguishing physical characteristic of these rounds is the case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant force the projectile out of the gun barrel. Immediately after leaving the gun barrel, the air pressure on the closing cup and the centrifugal force action on the body and balls cause the canister to break at the slits, dispersing the balls in a cone-shaped pattern along the line of flight.

Tabulated Data:

Complete round:

Type	Antipersonnel
Weight	27.18 lb
Length	32.07 in.
Cannon used with	M32 or M48

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Projectile:
- Body material ---------- Steel
- Color:
  - Old---------- Black w/white marking
  - New ---------- Olive drab w/white marking
- Filler and weight ---------- Steel balls, 9 lb

Components:
- Cartridge case ---------- M88B1, M88
- Propelling charge ---------- M6, 5 lb
- Primer ---------- M62, percussion

Performance:
- Maximum range ---------- 155 m (192 yd)
- Muzzle velocity ---------- 716 mps (2400 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 88 lb
- Dimensions ---------- 37-5/16 x 11 x 7-5/32 in.
- Cube ---------- 1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- Ammunition FOR CANNON WITH SOLID PROJECTILE
DODAC ---------- 1315-C121
Drawing number ---------- 9204458

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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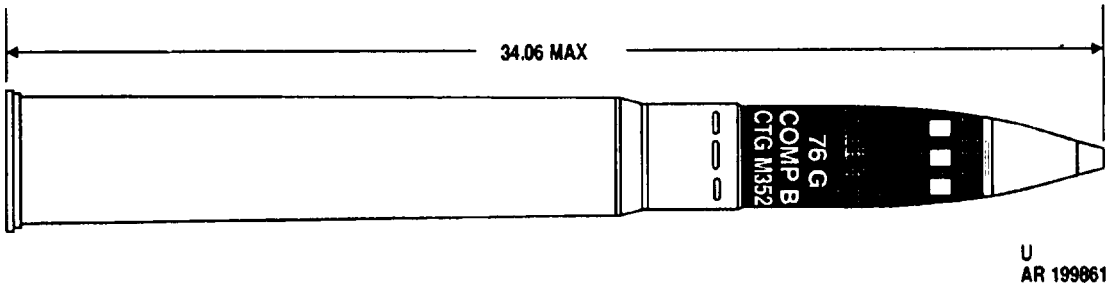
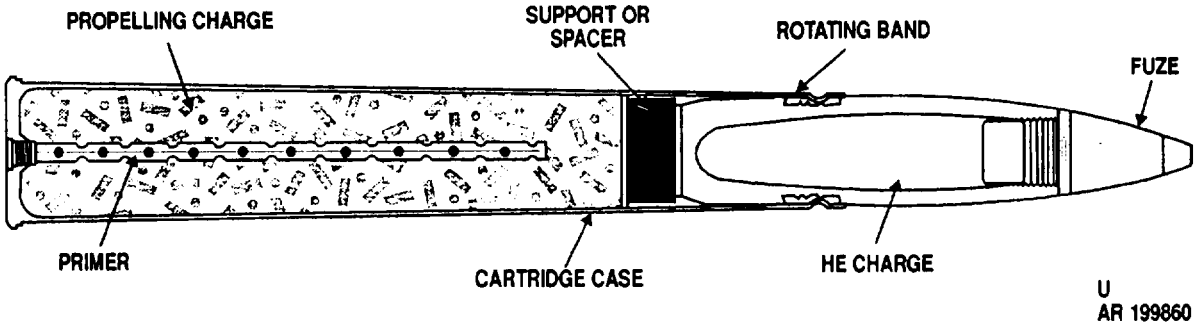
CARTRIDGE, 76 MILLIMETER: HE, M352





Type Classification:

OBS MSR 11756003.

Use:

This fixed cartridge is intended for fragmentation, blast, or mining effect and is used in 76mm guns against light materiel and personnel.

Description:

The projectile is a thin walled, forged steel casing with an explosive charge cavity, filled with Composition B, extending almost the full length of the body. The projectile is assembled with a nose fuze. A brass or steel cartridge case, containing a single-base propellant and a percussion primer, is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases created by the burning propellant force the projectile from the gun barrel. U on impact, fuze functioning detonates the explosive charge creating blast and fragmentation.

Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 25.52 lb
- Length ---------- 34.06 in.
- Cannon used with ---------- M32 or M48

Projectile:
- Body material ---------- Steel
- Color ---------- Olive drab w/ yellow marking
- Filler and weight ---------- Comp B, 1.46 lb

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Components:
- Cartridge case ---------- M88B1 (steel); M88 (brass)
- Propelling charge ---------- M6, 3.64 lb
- Primer ---------- M58 or M68 percussion
- Fuze ---------- PD or MTSQ

Performance:
- Maximum range ---------- 14,338 m (16,010 yd)
- Muzzle velocity ---------- 716 mps (2400 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

* Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 86 lb
- Dimensions ---------- 39.15/16 x 10-15/16 x 7-3132 in.
- Cube ---------- 1.8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C122
Drawing number ---------- 75.1-293

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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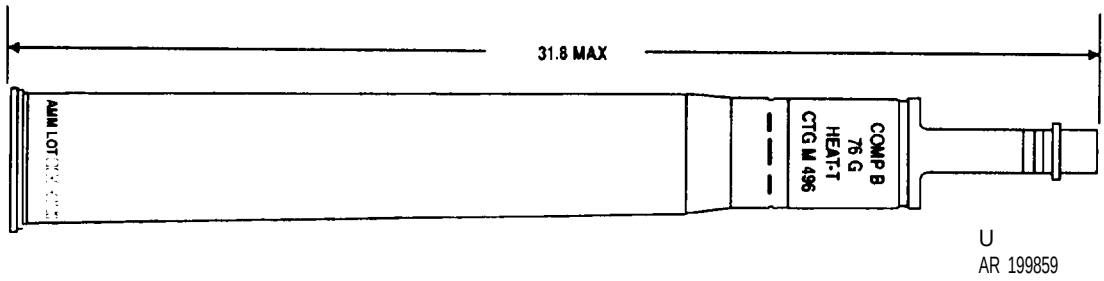
CARTRIDGE, 76 MILLIMETER: HEAT-T, M496



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AR 199859

Type Classification:

OBS MSR 11756003.

Use:

This fixed ammunition cartridge is used in 76mm gun cannons against heavily armored targets.

Description:

The projectile is a hollow, steel shell tapered at the rear and fitted on the nose with a standoff spike containing a piezoelectric element. The shell is filled with high explosive fitted around an internal copper cone. The apex of the cone is to the rear, thus shaping the charge. The base of the projectile is closed by an adapter which also provides a seat for the fuze. A boom and fin assembly is assembled to the adapter (for stabilization in flight) and a tracer element is located in the fin assembly. A point-initiating, base-detonating (PIBD) fuze is located in the adapter. A brass cartridge case containing a single-base propellant and a percussion primer is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, flash from the primer ignites the propellant. The burning propellant ignites the tracer and generates gas to propel the projectile from the gun barrel. The boom and fin assembly provides stability in flight and the tracer provides a visible trace of the trajectory. Upon impact, the piezoelectric element in the standoff spike initiates functioning of the PIBD fuze. The fuze detonates the explosive charge and causes the copper cone to collapse, creating a high velocity shock wave and a jet of metal particles which penetrate the target.

Tabulated Data:

Complete round:
- Type ---------- HEAT-T
- Weight ---------- 25.83 lb
- Length ---------- 31.8 in.
- Cannon used with ---------- M32 or M48

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/white markings and yellow band
- Filler and weight ---------- Comp B, 1.1 lb

Components:
- Cartridge case ---------- M171A1
- Propelling charge ---------- M6, 5.06 lb
- Primer ---------- M81, percussion
- Tracer ---------- M13
- Fuze ---------- PIBD-509A1

Performance:
- Maximum range ---------- 7488 m (8360 yd)
- Muzzle velocity ---------- 1060 mps (3550 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

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*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
Weight ---------- 72.5 lb
Dimensions ---------- 37-1/16 x11x 7-5/32 in
Cube ---------- 1.7 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- l315-C110
Drawing number ---------- 8848863

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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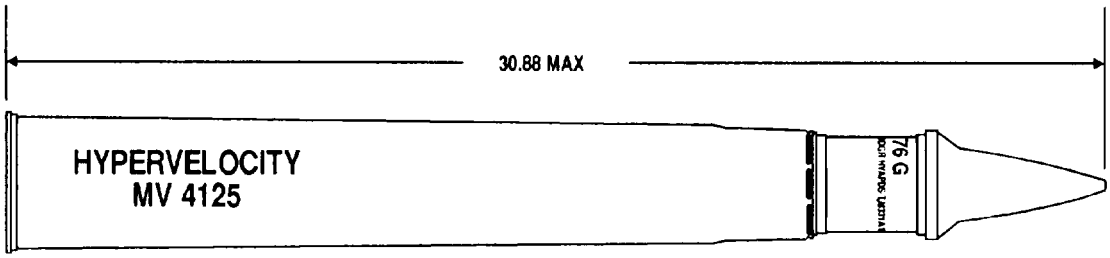
CARTRIDGE, 76 MILLIMETER: HVAP-DS-T, M331A1 AND M331A2



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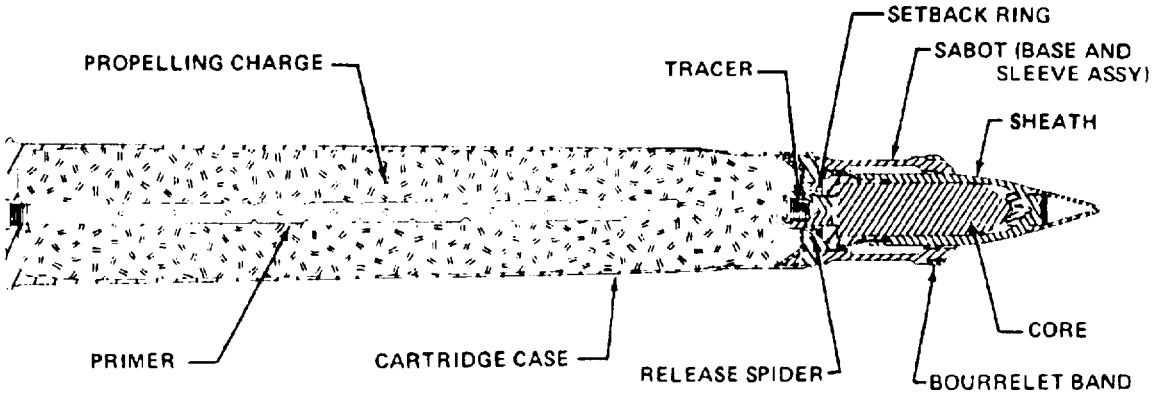
AR 199855



AR 199854

Type Classification:

OBS MSR 11756003.

Use:

This fixed ammunition is intended for use in 76mm gun cannons against armor.

Description:

The projectile consists of' a dense core of tungsten carbide steel, covered with a steel sheath, and a base and sleeve assembly called a sabot. The core is held in place inside the sabot by a sheet steel release spider. The projectile is inert, except for a tracer contained in the base. It is assembled to a steel cartridge case, which is loaded with a triple-base propellant and has a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the cartridge is fired, a setback ring moves rearward opening the release spider. Setback holds the sabot and core together until exit from the gun, at which time centrifugal force separates the sabot from the core. The tracer, ignited by the propellant, provides a visible trace during the first few seconds of flight. Upon impact, the projectile sheath crumples and the tungsten carbide core penetrates the target.

Difference Between Models:

See Tabulated Data for difference in cartridge cases and tracer assemblies.

Tabulated Data:

Complete round:

Type	HVAP-DS-T
Weight	20.7 lb
Length	30.88 in.
Cannon used with	M32, M48

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Projectile:
- Body material ---------- Tungsten carbide steel and aluminum
- Color ---------- Black w/white marking

Components:
- Cartridge case ---------- M331A2: M88B1; M331A1: M88
- Propelling charge ---------- M17, 5.57 lb
- Primer ---------- M58 percussion
- Tracer ---------- M5 (M331A1); M5A3 (M331A2)

Performance:
- Maximum range ---------- 21,607 m (24,127 yd)
- Muzzle velocity ---------- 1231 mps (4125 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upperlimit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 71 lb
- Dimensions---------- 36-3/4 x 11-1/16 x 7-5/32 in.
- Cube ---------- 1.68 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C125
Drawing number ---------- 75-1-308

Limitations:

The danger area from the discarded sabot extends downrange approximately 750 meters along the path of trajectory and spreads out to 45 meters on either side of the trajectory at that range.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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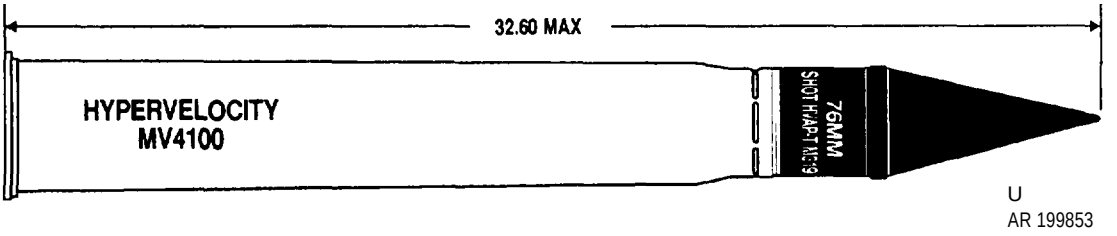
CARTRIDGE, 76 MILLIMETER: HVAP-T, M319



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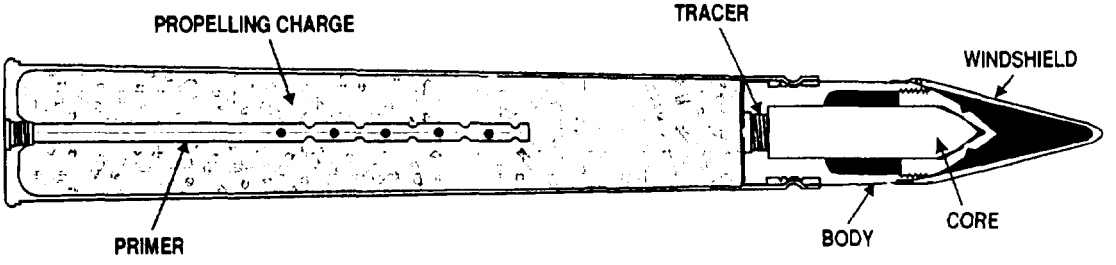
AR 199853



U
AR 199852

Type Classification:

C & T AMCTC 6267 dtd 1968.

Use:

This fixed ammunition is a high velocity cartridge intended for use in 76mm gun cannons against armor.

Description:

The projectile consists of a core of tungsten carbide housed in an aluminum body fitted with an aluminum windshield, and it contains a tracer assembly in the base. The brass or steel cartridge case contains a single-base propellant and a percussion primer, and is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is tired, the flash from the primer ignites the propellant. The burning propellant ignites the tracer and creates gases which propel the projectile from the gun barrel. The tracer provides a luminous trace during the early stages of flight. Upon impact, the windshield breaks up and the tungsten carbide core penetrates the target by kinetic energy.

Tabulated Data:

Complete round:
- Type ---------- HVAP-T
- Weight ---------- 19.04 lb
- Length ---------- 32.6 in
- Cannon used with ---------- M32, M48

Projectile:
- Body material ---------- Aluminum alloy
- Core ---------- Tungsten carbide
- Color ---------- Black w/white markings

Components:
- Cartridge case ---------- M88B1, M88
- Propelling charge ---------- M6, 5.03 lb
- Primer ---------- M62, M58 percussion
- Tracer ---------- M5A1B1 or M5A1

Performance:
- Maximum range ---------- 9885 m (11,038 yd)
- Muzzle velocity ---------- 1234 mps (4135 fps)

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Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
* Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	66.75 lb
Dimensions	37-3/16 x 11-1/6 x 7-5/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT description	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C124
Drawing number	75-1-295

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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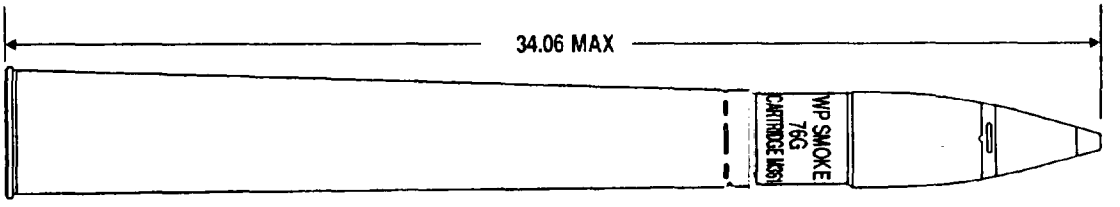
CARTRIDGE, 76 MILLIMETER: SMOKE, WP, M361A1 OR M361



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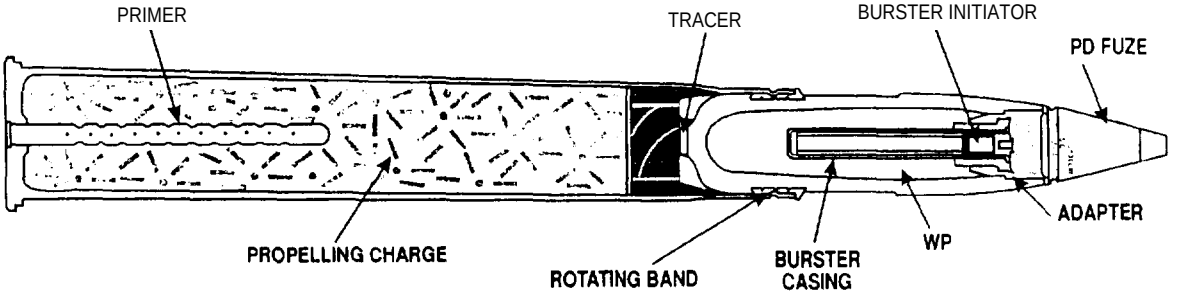

U
AR 199850

Type Classification:

OBS MSR 11756003.

Use:

This fixed ammunition is used in 76mm guns for screening and spotting tire. The cartridge also has a slight incendiary effect.

Description:

The projectile body is a thin walled, forged steel casing. The point-detonating fuzed projectile contains a white phosphorous (WP) filler and a combination one-piece aluminum burster casing and adapter. The burster casing houses a projectile burster and a burster initiator loaded with tetrytol. The brass or steel cartridge case assembled to the projectile contains a single-base propellant and a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, the primer flashes igniting the propellant. Gases created by the burning propellant force the projectile from the gun barrel. Upon impact, the burster initiator, activated by the point-detonating fuze, detonates the burster charge. This ruptures the projectile casing and expells the WP filler. Upon contact with the air, the WP ignites creating a dense white smoke.

Difference Between Models:

The M361 is similar to the M361A1 except that the burster is contained in a two-piece steel casing and the adapter is a separate component. Also, the M361A1 includes a tracer assembly in the base of the projectile. See Tabulated Data for cartridge case and fuze differences.

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Tabulated Data:

Complete round:	
Type	Smoke WP
Weight	25.82 lb
Length	34.06 in.
Cannon used with	M32, M48
Projectile:	
Body material	Forged steel
Color:	
Old	Gray w/yellow band and yellow marking
New	Light green w/yellow band and red marking
Filler and weight	WP, 1.38 lb
Burster	M28, 1.2 oz tetrytol
Burster initiator	M2
Component:	
Cartridge case	M361A1: M88B1; M361: M88
Propelling charge	M6, 3.64 lb
Primer	M68, M58 percussion
Fuze	PD: M521 (M361A1); M48A3 (M361)
Performance:	
Maximum range	14,594 m (16,296 yd)
Muzzle velocity	713 mps (2400 fps)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+125°F
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	86 lb
Dimensions	39-15/16 x 10-15/16 x 7-3/32 in.
Cube	1.8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C128
Drawing number	P85133

Limitations:

Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures exceeding +125°F.

Store and transport rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases so that if WP melts it will resolidify with void space in the nose of the projectile, Erratic performance may occur if voids exist inside the WP filler.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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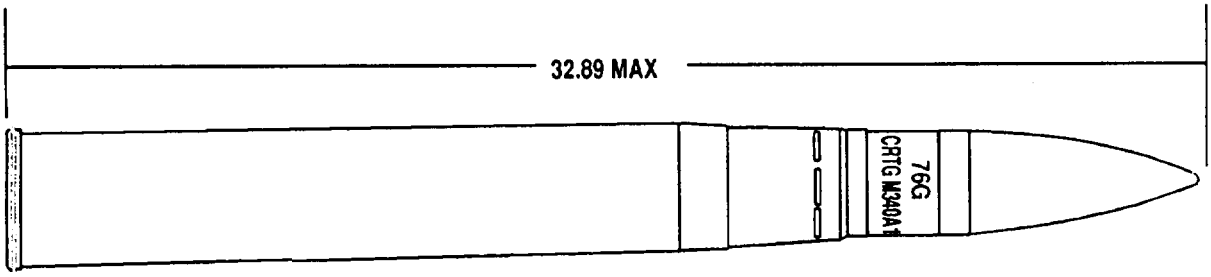
CARTRIDGE, 76 MILLIMETER: TP-T, M340A1 AND M340



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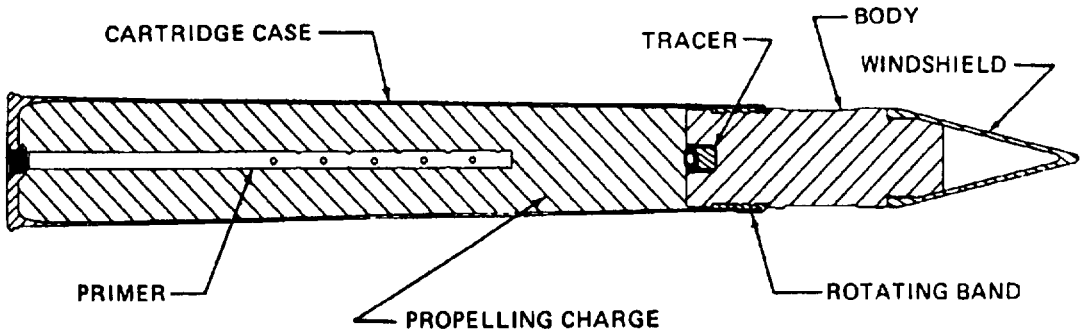

U
AR 199856

Type Classification:

OBS MSR 11756003.

Use:

This cartridge is intended for target practice.

Description:

The projectile consists of a steel body with a gilding metal rotating band and an aluminum windshield. A tracer is threaded into the base of the projectile. The brass or steel cartridge case is loaded with a triple-base propellant and fitted with a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, the primer flashes igniting the propellant and tracer. Gases created by the burning propellant force the projectile from the gun barrel. The tracer burns with a visible trace for approximately three seconds of projectile flight. Upon impact, there is little penetration of the target because the round lacks armor-piercing capability.

Difference Between Models:

See Tabulated Data for difference in cartridge cases and tracer assemblies.

Tabulated Data:

Complete round:
---------- TP-T
Weight ---------- 27.32 lb
Length ---------- 32.89 in
Cannon used with ---------- M32, M48

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Projectile:
- Body material ---------- Steel
- Color:
  - Old---------- Blue or black w/white marking
  - New ---------- Blue w/white marking

Components:
- Cartridge case ---------- M340A1: M88B1: M340: M88
- Propelling charge ---------- M30, 5.6 lb
- Primer ---------- M58, percussion
- Tracer ---------- M5A2B1 (M340); M13 (M340A1)

Performance:
- Maximum range ---------- 14,704 m (16,419 yd)
- Muzzle velocity ---------- 955 mps (3200 f p s)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 88 lb
- Dimensions ---------- 38-5/8 x 11-1/16 x 7-5/32 in.
- Cube ---------- 1.8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C127
Drawing number ---------- 8857345

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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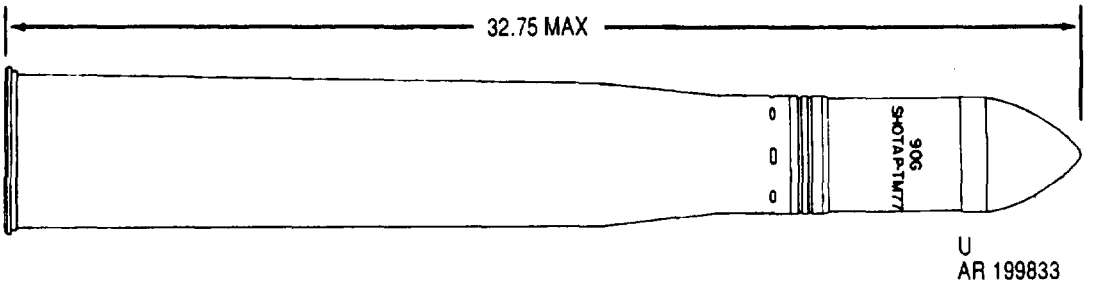
CARTRIDGE, 90 MILLIMETER: AP-T, M77



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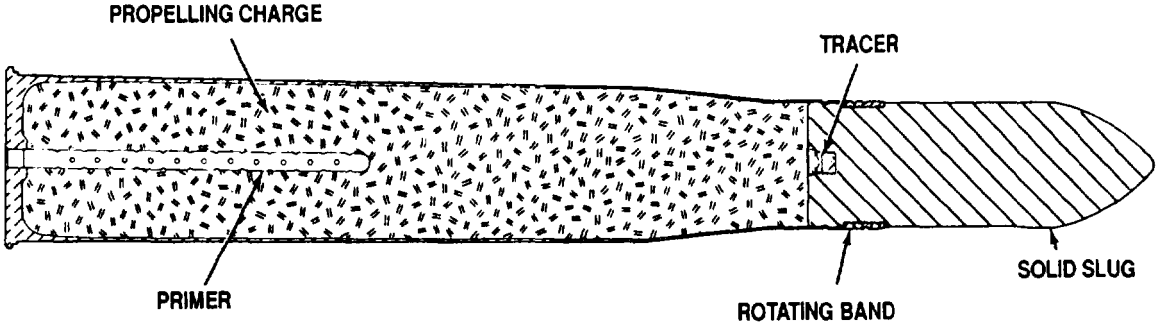
AR 199833



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AR 199832

Type Classification:

OBS MSR 11756003.

Use:

This cartridge is an obsolescent armor-piercing model currently used for training purposes in 90mm guns.

Description:

The projectile is a hardened steel monobloc slug and has no windshield. The projectile base is threaded to receive a tracer. The brass or steel cartridge case is loosely packed with propellant and is fitted with a percussion primer in the base.

Functioning:

When the weapon is fired, the burning propellant ignites the tracer and creates gases. The gases propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. The projectile is designed to penetrate the target solely by kinetic energy.

Tabulated Data:

Complete round:
- Type ---------- AP-T
- Weight ---------- 42.04 lb
- Length ---------- 32.75 in.
- Cannon used with ---------- M36, M41 or M54

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/white marking

Components:
- Cartridge case ---------- M19, M19B1
- Propelling charge ---------- M6, 7.31 lb
- Primer ---------- M28A2, M28B1
- Tracer ---------- M3

Performance:
- Maximum range ---------- 11,270 m (12,325 yd)
- Muzzle velocity ---------- 821 mps (2700 fps)

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Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	132 lb
Dimensions	43-5/8 x 13 x 8-5/32 in.
Cube	2.69 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	
Quantity-distance class	5
Storage compatibility group	E
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C259
Drawing number	75-1-136

References:

AMC-P 700-3-3
SB 700-20
TM9-1300-251-20

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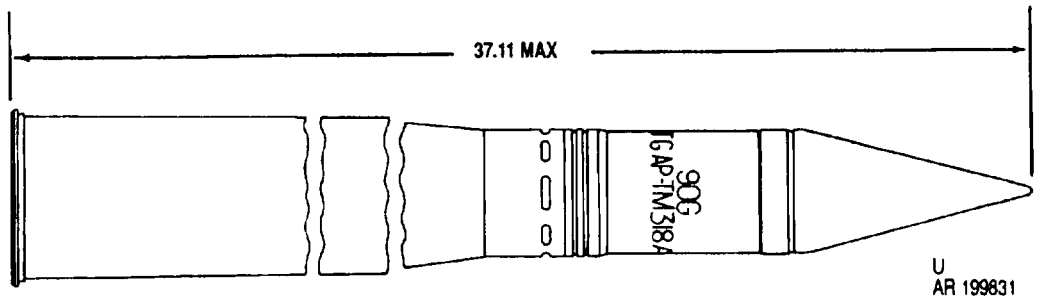
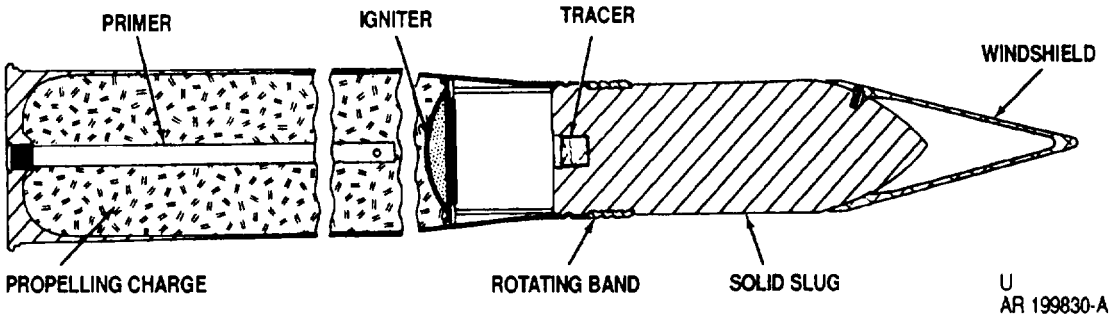
CARTRIDGE, 90 MILLIMETER: AP-T, M318, MV2800; AND M318 (T33E7) OR M318A1, MV3000





Type Classification:

STD OTCM 36841 dtd 1958 (M318).
STD OTCM 37119 dtd 1959 (M318A1).

Use:

This armor-piercing cartridge is for use in 90mm guns against armored materiel.

Description:

The body of the projectile is made of hardened steel, has a flat base, and has a nose that is shaped to a relatively short ogive. A lightweight aluminum windshield is welded to the projectile. The base of the projectile is threaded to receive a tracer. The cartridge case is loosely packed with propellant, and the base is fitted with a percussion primer. An igniter to assist uniform propellant ignition is fitted below the closing disk.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. The projectile is designed to penetrate the target solely by kinetic energy.

Difference Between Models:

See Tabulated Data.

Tabulated Data:

Complete round:

	M318	M318 (T33E7) or M318A1
Type	AP-T	AP-T
Weight	43.98 lb	43.91 lb
Length	37.43 in.	37.11 in.
Cannon used with	M36, M41 or M54	
Projectile:		
Body material	Steel	
Color	Black w/white marking	

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Components:

	M318	M318 (T33E7) or M318A1
Cartridge case	M19, M19B1	M108, M108B1
Propelling charge	M6, 8.6 lb	M17, M30, 8.6 lb
Primer	M49 (T33)	M58
Tracer	(Red) M5A2B1, M5A2, 0.1 lb	M5A2B1, M5A2 or M13, 7.5 g

Performance:

Maximum range	19,570 m (20,400 yd)	21,031 m (23,000 yd)
Muzzle velocity	(2800 fps)	(3000 fps)

Temperature limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 2 containers per wooden box

*Packing box:

Weight	130.47 lb
Dimensions	44 x 12-7/8 x 8-1/32 in.
Cube	2.7 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C285 (MV3000); 1315-C259 (MV2800)
Drawing number	75-1-358 (M318); 9207966 (M318A1)

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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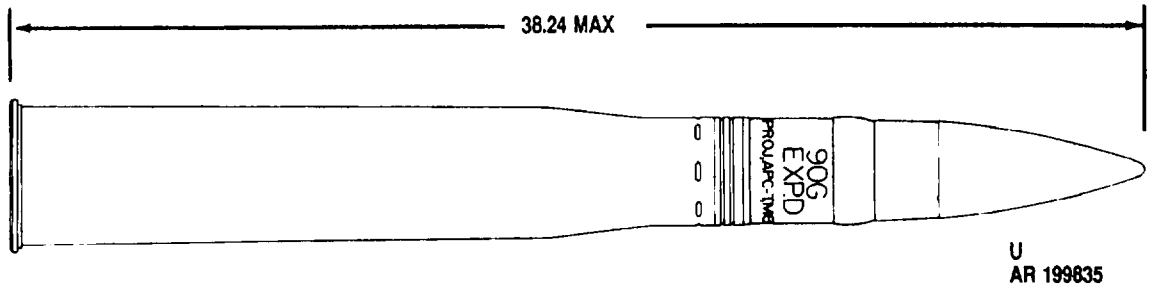
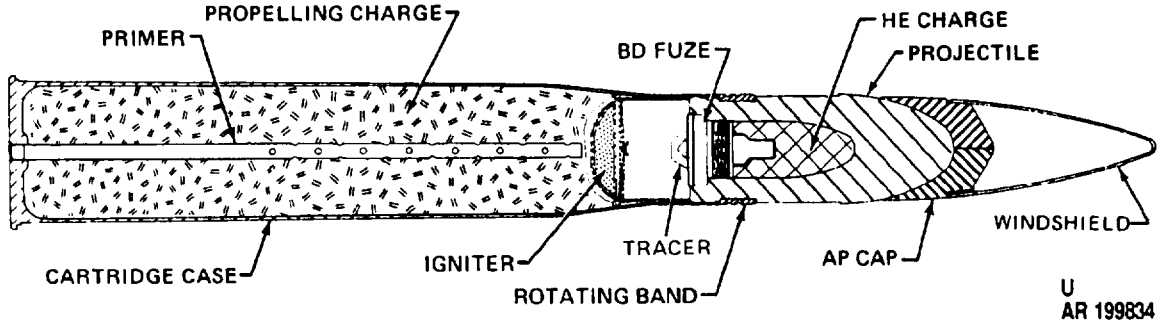
CARTRIDGE, 90 MILLIMETER: APC-T, M82





Type Classification:

OBS MSR 11756003.

Use:

This cartridge is fired from 90mm guns and is designed for use against face-hardened armored materiel.

Description:

The hardened steel projectile has a flat base and a nose shaped to a relatively short ogive. It is fitted with an armor-piercing cap. A small cavity in the rear portion of the body holds a small explosive charge and is threaded to receive a delayed-action base-detonating fuze with tracer. The cartridge is loaded with one of two different primers and a varying amount of propellant, with or without an igniter charge depending on the velocity desired.

Functioning:

When the weapon is fired, the resultant burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. The armor plate of the target is penetrated by the hardened face of the armor-piercing cap solely by kinetic energy. The softer core protects the hardened point of the projectile body by distribution of stresses. The base-detonating fuze, a simple inertia type, functions with delay action detonating the explosive tiller after projectile penetration.

Tabulated Data:

Complete round:

Type	APC-T
Weight	42.75 or 43.87 lb
Length	38.24 in.
Cannon used with	M36, M41 or M54

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Projectile:
- Body material ---------- Steel
- Color ---------- Olive drab w/black band and yellow marking
- Filler and weight ---------- Expl D, 0.31 lb

Components:
- Cartridge case ---------- M19
- Propelling charge ---------- M6, 7.31 to 8.06 lb
- Primer ---------- M28A1, M49
- Tracer ---------- Integral with fuze (red)
- Fuze ---------- BD, M68 or M68A1

Performance:
- Maximum range ---------- 19,570 m (21,400 yd)
- Muzzle velocity ---------- 790 mps (2600 fps); 851 mps (2800 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

* Packing box:
- Weight ---------- 136.5 lb
- Dimensions ---------- 44-21/32 x 13 x 7-3/8 in.
- Cube ---------- 2.75 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C260
Drawing number ---------- 75-1-145

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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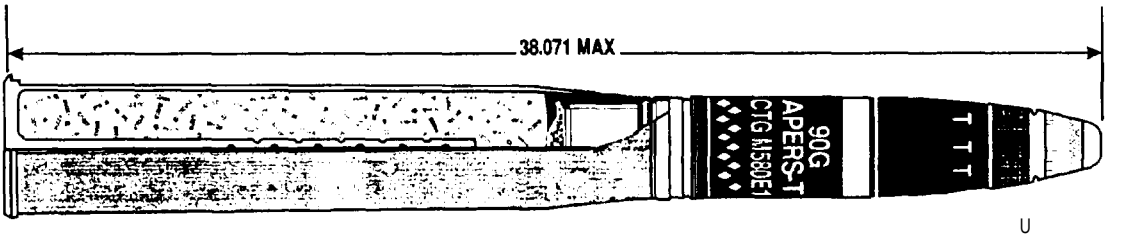
CARTRIDGE, 90 MILLIMETER: APERS-T, M580



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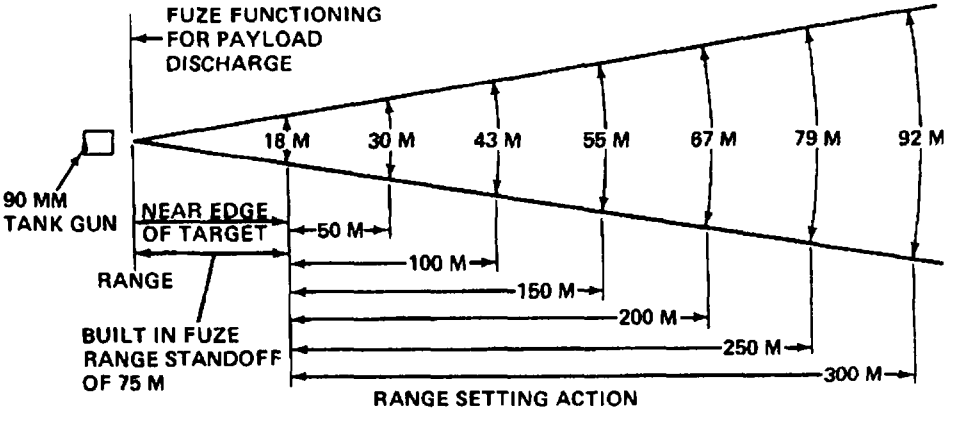

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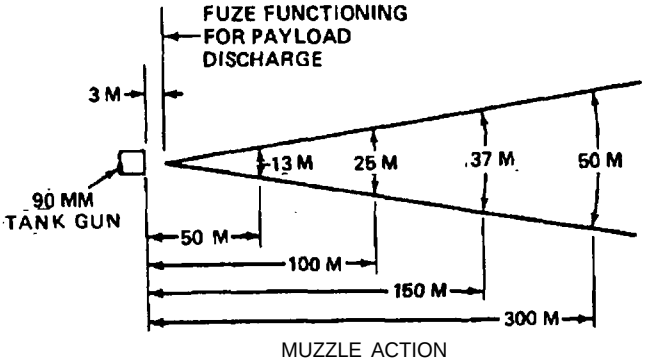

AR 199883

Type Classification:

STD AMCTC 9575 dtd 1972.

Use:

This fixed cartridge is fired from 90mm guns and is for antipersonnel use at both close and long ranges. The cartridge is particularly effective against personnel in dense foliage.

Description:

The projectile consists of an aluminum forward body, a steel connector, and a hollow steel base. Threaded to the forward body is an aluminum fuze adapter containing four radially oriented detonators and an axially oriented flash tube, relay and detonator. The central steel flash tube connects the projectile base to the detonator in the fuze adapter. The body is loaded with flechettes and also contains a yellow dye

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mixture that serves as a spotting charge. A plastic bag of flake propellant is located in the hollow base. A mechnical-time fuze is assembled to the fuze adapter, and a tracer is attached to the base of the projectile. The projectile is crimped to a cartridge case loosely filled with propellant and fitted with a percussion primer.

Functioning:

When the weapon is fired, the primer ignites the propellant. The burning propellant ignites the tracer and creates gases which propel the projectile from the gun tube. The fuze will arm immediately and will function according to the time setting. The fuze functions as soon as the projectile leaves the weapon if set for muzzle action. If set for range, the fuze will function 75 to 100 meters short of set range. This built-in standoff is designed to assure maximum application of the dispersion pattern to the target. Concurrently with fuze functioning, the four radially oriented detonators and the axially oriented detonator and relay in the fuze adapter are exploded. Detonation of the radially oriented detonators rips open the forward skin of the projectile ogive, permitting the flechettes in the forward section to be acted upon by centrifugal force. The axially oriented detonator and relay flash through the tube to ignite the base charge. Pressure from the burning charge forces the flechettes and spotting charge forward and out of the projectile. The combination of forward and centrifugal forces results in a conical dispersal pattern. The spotting charge marks the approximate fuze functioning point, allowing adjustment of fire for maximum effect.

Tabulated Data:

Complete round:
- Type ---------- APERS-T
- Weight ---------- 41.25 lb
- Length ---------- 38.071 in.
- Cannon used with ---------- M36, M41 or M54

Projectile:
- Body material ---------- Steel/ aluminum
- Color ---------- Olive drab w/white marking and white diamonds
- Filler and weight ---------- 4200, 8 gr, flechettes, 4.5 lb

Components:
- Cartridge case ---------- M200
- Propelling charge ---------- M6, 9 lb
- Primer ---------- M58 percussion
- Tracer ---------- M13 red, 0.13 lb
- Base charge ---------- M9, 25 gr
- Faze ---------- MT, M711

Performance:
- Maximum range ---------- 4389 m (4800 yd)
- Muzzle velocity ---------- 914.4 mps (3000 fps)
- Maximum effective range (from point of fuze functioning) ---------- 300 m (328 yd)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 128 lb
- Dimensions ---------- 44-13/16 x 13-3/16 x 8-7/16 in.
- Cube ---------- 2.8 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C275
Drawing number ---------- 9216454

Limitations:

Before firing, clear friendly personnel from dispersion cone area. Firing over the heads of friendly troops is prohibited.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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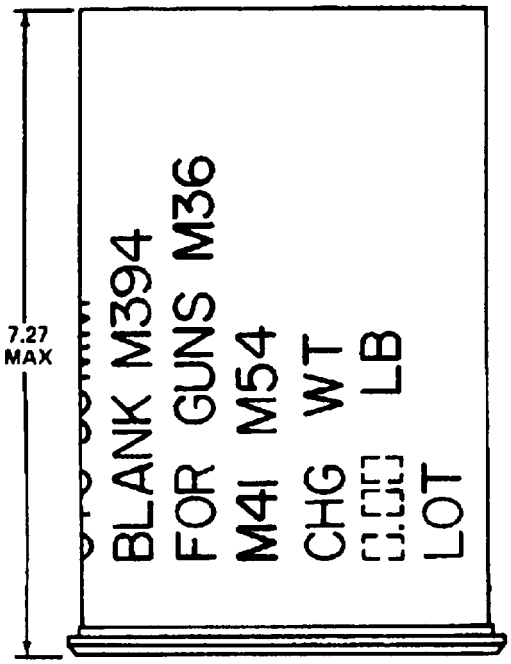
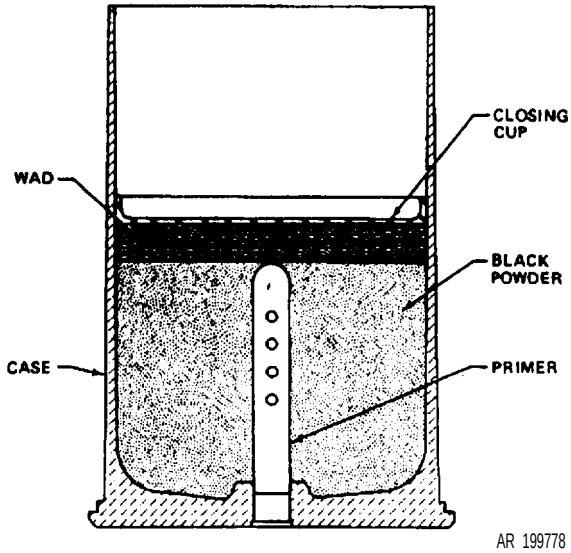
CARTRIDGE, 90 MILLIMETER: BLANK, M394



AR 199779



AR 199778

Type Classification:

STD OTCM 38091 dtd 1962.

Use:

This blank cartridge is provided for saluting purposes and simulated firing in 90mm guns.

Description:

The cartridge consists of a cartridge case, a primer, and a charge of black powder. A polystyrene closing cup is used to seal the charge inside the case.

Functioning:

After the primer is initiated by the firing pin of the weapon, the black powder charge is ignited producing a loud report and flash.

Tabulated Data:

Complete round:	
Type	Blank
Weight	8.23 lb
Length	7.27 in.
Cannon used with	M36, M41 or M54
Components:	
Body material	Brass or aluminum
Filler and weight	Black powder and potassium nitrate, 1.75 lb
Cartridge case	M27, M27B1
Primer	M1A2
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+ 125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+ 160°F (for period not more than 4 hr/day)
*Packing	1 cartridge in fiber container; 8 containers per wooden box
*Packing box:	
Weight	98.6 lb
Dimensions	25-13/16 x 12-15/16 x 10-23/32 in.
Cube	2.12 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

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Shipping and Storage Data:

UNO serial number	0327
Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC	1315-C261
Drawing number	7549210

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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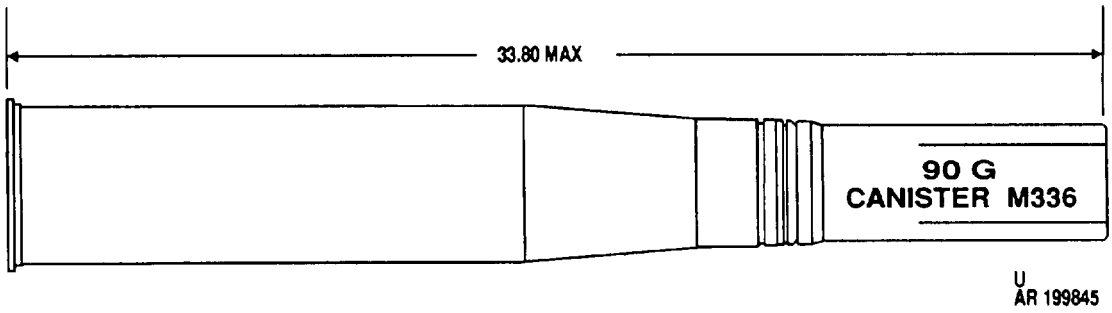
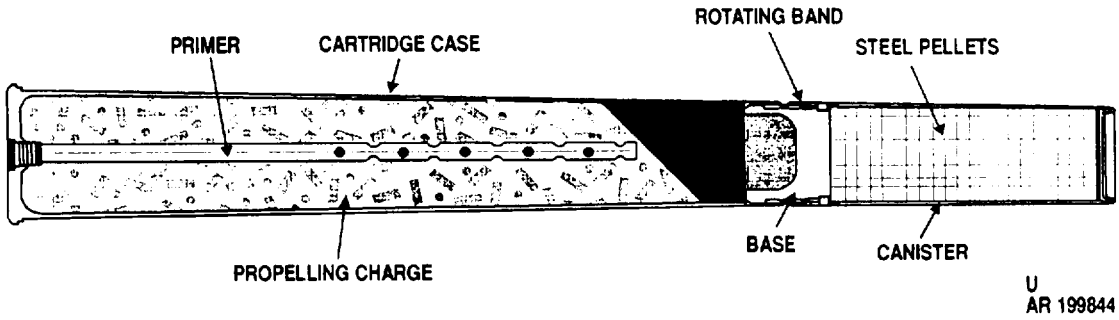
CARTRIDGE, 90 MILLIMETER: CANISTER, M336





Type Classification:

CON MSR 11756003.

Use:

This cartridge is fired from 90mm guns and is intended primarily for antipersonnel use at close range.

Description:

The canister consists of a thin steel cylindrical body welded to a heavy steel cup-shaped base, A gilding metal rotating band is assembled to the base. The body has four equally spaced axial slits extending from the forward end of the canister for approximately half the canister length. The canister body is filled with approximately 1,281 stacked steel cylindrical pellets held in place by a soldered closing disk. A percussion primed cartridge case containing propellant is crimped to the projectile.

Functioning:

Immediately after the canister leaves the muzzle of the gun, the air pressure on the closing disk and the centrifugal force acting on the body and pellets cause the canister to break at the four slits on the body with resultant conical dispersion of the pellets. The round has an effective range of 0 to 183 meters. The minimum angle of dispersion is approximately 9°.

Tabulated Data:

Complete round:	
Type	Canister
Weight	41.6 lb
Length	33.8 in.
Cannon used with	M36, M41, M54
Projectile:	
Body material	Steel
Color	Olive drab w/white marking
Filler and weight	1281 slugs, 14.9 lb
Propelling charge:	
Cartridge case	M108B1
Propellant	M2, 8 lb
Primer	M58 percussion
Performance:	
Minimum effective range	0 m
Maximum effective range	183111 (200 yd)
Muzzle velocity	858 mps (2870 fps)

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Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packingbox:
- Weight ---------- 111 lb
- Dimensions ---------- 40-1/16 x 12-7/8 x 8-1/32 in.
- Cube ---------- 2.4 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C262
Drawing number ---------- 9214203

Limitations:

Cartridge may not be fired over the heads of friendly troops.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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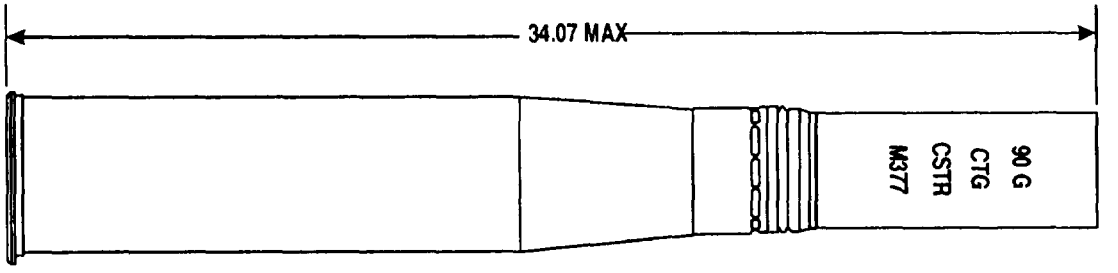
CARTRIDGE, 90 MILLIMETER: CANISTER, M377



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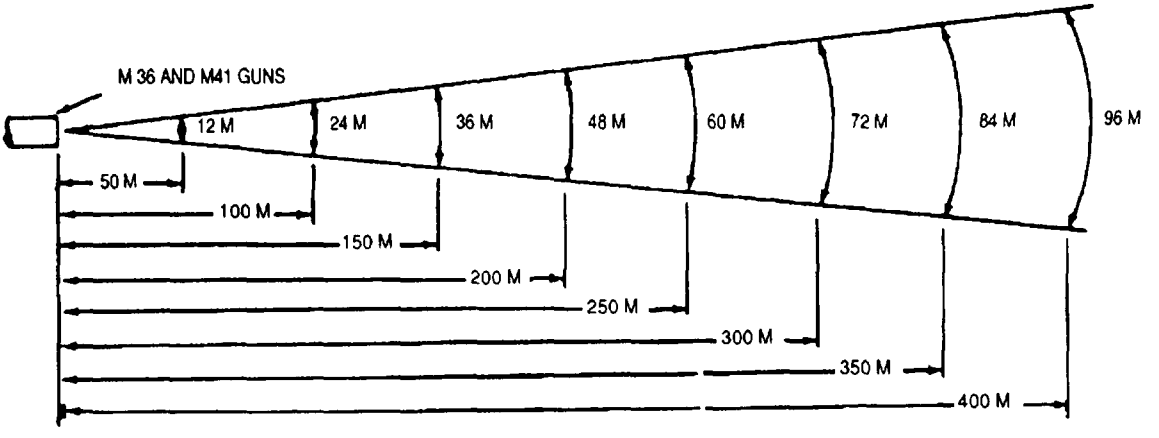

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AR 199842

Type Classification:

CON MSR 11756003.

This cartridge is fired from 90mm guns and is intended primarily for antipersonnel use at close range. The cartridge is effective in dense foliage.

Description:

The canister consists of a thin steel cylindrical body welded to a heavy steel cup-shaped base assembly with a gilding metal rotating band. The body has four equally spaced axial grooves extending from the forward end of the canister for approximately half the canister length. The canister body is filled with flechettes held in place by a crimped closing cup. A percussion primed cartridge case filled with propellant is crimped to the projectile.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the canister out of the gun tube. Immediately after the canister leaves the muzzle of the gun, the air pressure on the closing cup and the centrifugal force acting on the body and flechettes cause the canister to break at the four grooves on the body resulting in conical dispersion of the flechettes. The conical angle of dispersion is approximately 14°.

Tabulated Data:

Complete round:

Type	Canister
Weight	39.3 lb
Length	34.07 in.
Cannon used with	M36, M41 or M54

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Projectile:
- Body material ---------- Steel
- Color ---------- Olive drab w/white marking and white diamonds
- Filler and weight ---------- 5600, 8 gr flechettes, 6.8 lb

Components:
- Cartridge case ---------- M108B1
- Propelling charge ---------- M6, 9 lb
- Primer ---------- M58 percussion

Performance:
- Minimum range ---------- 0 m
- Maximum range ---------- 402 m (440 yd)
- Muzzle velocity ---------- 851 mps (2950 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 118 lb
- Dimensions ---------- 40-5/16 x 12-15/16 x 8-5/32 in.
- Cube ---------- 2.5 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity -distance class -------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C601
Drawing number ---------- 9214706

Limitations:

Before firing, clear friendly personnel from dispersion cone area. Firing over the heads of friendly troops is prohibited.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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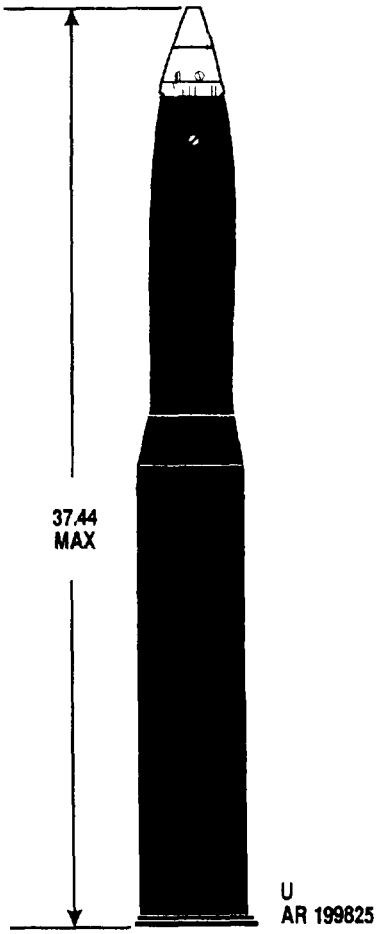
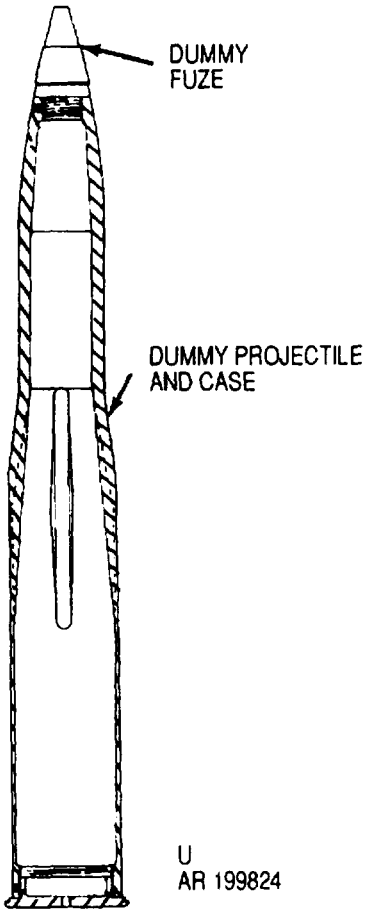
CARTRIDGE, 90 MILLIMETER: DUMMY, M12, M12B1 AND M12B2





Type Classification:

CON MSR 11756003.

Use:

This dummy cartridge is used for training in handling and loading ammunition for 90mm guns.

Description:

The dummy cartridge simulates a high-explosive loaded round of 90mm ammunition in size, weight, and center of gravity. A completely inert bronze (M12), malleable iron (M12B1), or manganese bronze (M12B2) body is fitted with a bronze or steel base. The nose of the cartridge may be fitted with a dummy or an inert fuze or it may be unfuzed.

Functioning:

The dummy cartridge is completely inert and is nonfunctioning.

Tabulated Data:

Complete round:
- Type---------- Dummy
- Weight ---------- 42.04-44.00 lb
- Length ---------- 37.44 in.
- Cannon used with ---------- M36, M41 or M54

Projectile:
- Body material ---------- Manganese bronze
- Color ---------- Bronze w/white marking
- Faze ---------- Dummy M80

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*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
Weight ---------- 132 lb
Dimensions ---------- 43-5/8 x 13 x 8-5/32 in.
Cube ---------- 2.69 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- N/A
Storage compatibility group --- N/A
DOT shipping class ---------- N/A
DOT designation ---------- None
DODAC ---------- 1315-C263
Drawing number ---------- 72-3-76

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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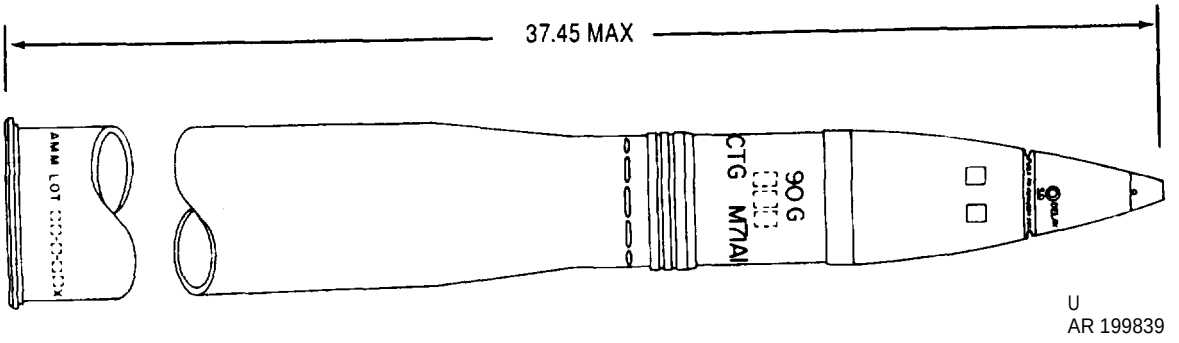
CARTRIDGE, 90 MILLIMETER: HE-T, M71A1, AND HE, M71



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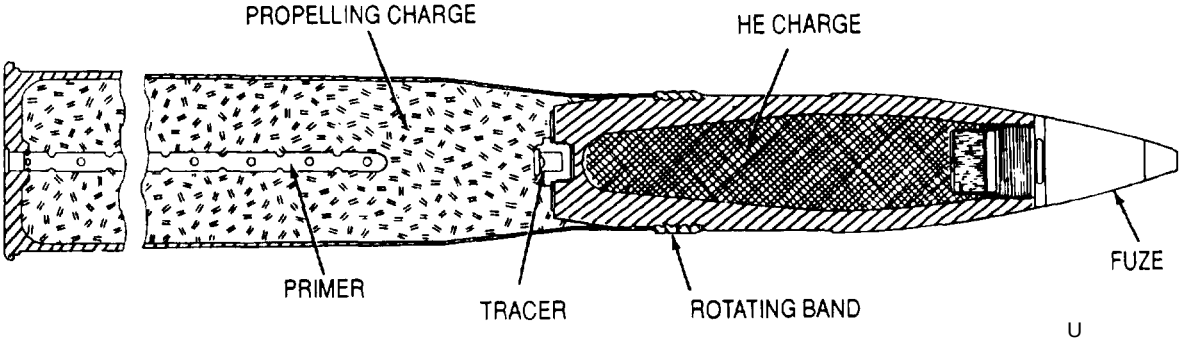

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AR 199838

Type Classification:

STD OTCM 37436 dtd 1960 (M71A1).
CON MSR 11756003 (M71).

Use:

This cartridge is used in 90mm guns against personnel and materiel, producing blast and fragmentation at the target.

Description:

The hollow steel forged projectile has a boat-tailed base and a streamlined ogive. Fuze cavity may be a normal or a deep cavity type. The projectile is loaded with 2.15 pounds (1.68 lb, deep cavity) of Composition B or TNT. A tracer is threaded into the projectile base (M71A1). A point-detonating fuze is assembled to the projectile. Loaded projectile weights fall into one of three weight zones.

Functioning:

When the weapon is fired, the burning propellant ignites the tracer and creates gases which propel the projectile out of the gun tube. The tracer burns for a minimum of three seconds. Upon impact, the fuze functions on superquick or delay, as preset, and detonates the high-explosive filler producing Mast and fragmentation.

Difference Between Models:

M71A1 has a tracer; M71 does not. M71A1 has M1 propellant resulting in lower velocity; M71 has M6 or M15 propellant.

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Tabulated Data:

Complete round:

	M71A1	M71
Type	HE-T	
Weight	38.8-39.54 lb	4l.19-41.93 lb
Length	37.46 in.	
Cannon used with	M36, M41 or M54	

Projectile:

Body material	Steel
Color	Olive drab w/yellow marking
Filler and weight	Comp B, 2.15 lb

Component:

Cartridge case	M19, M19B1
Propelling charge	M1 5.33 lb (M71A1); M6 or M15, 7.31 lb (M71)
Primer	M28B2, M28A2
Tracer	XM10 (M71A1)
Fuze	PD, M51A5, M557; MTSQ, M520 Series, M564

Performance:

Maximum range	15,800 m (17,300 yd) (M71A1); 17,800 m (19,475 yd) (M71)
Muzzle velocity	730 mps (2400 fps) (M71A1); 823 mps (2700 fps) (M71)

Temperature limits:

Firing:

Lower limit	-40°F
Upper limit	+125°F

Storage:

Lower limit	-80°F (for period not more than 3 days)
Upper limit	+ 160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 2 containers per wooden box

*Packing box:

Weight	132 lb
Dimensions	43-5/8 x 13 x 8-5/32 in.
Cube	2.69 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C280 (M71A1); 1315-C265 (M71); 1315-C266 (M71); 1315-C267 (M71)
Drawing number	8849017-1 (M71A1); 75-1-157 (M71)

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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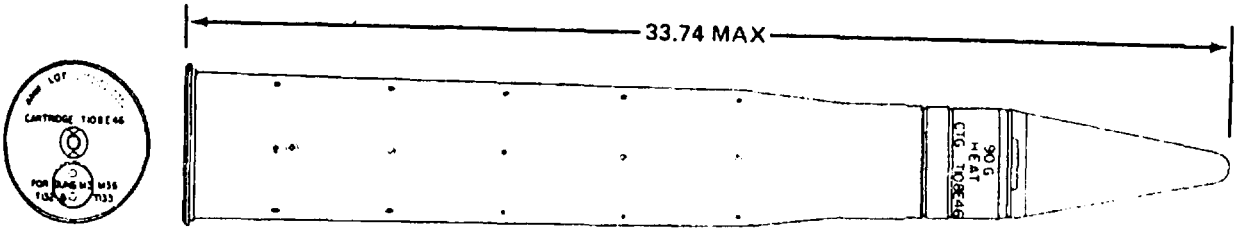
CARTRIDGE, 90 MILLIMETER: HEAT, M348A1 (T108E46) AND M348 (T108E40)



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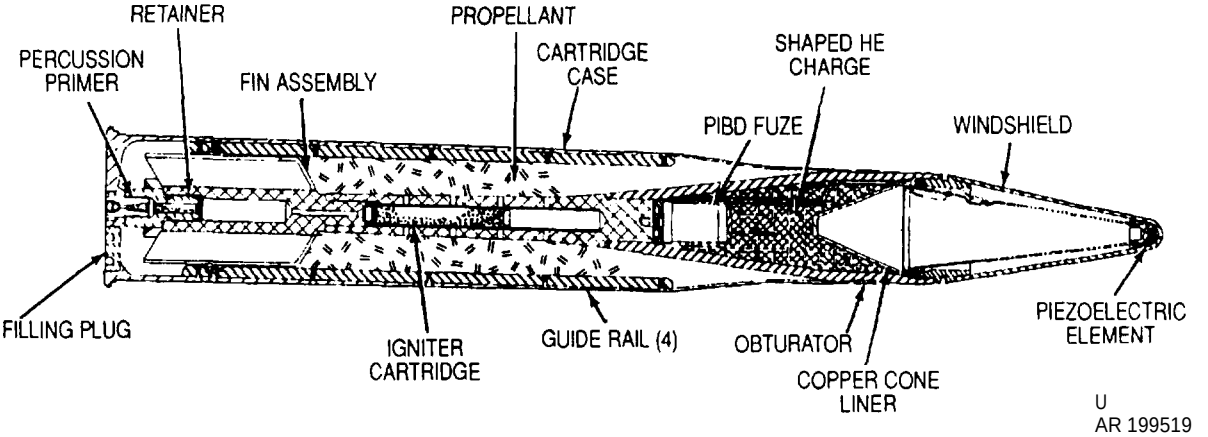

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AR 199519

Type Classification:

OBS AMCTC 6267 dtd 1968.

Use:

This cartridge is fired from 90mm gun cannons against armored targets.

Description:

The cartridge consists of a fin-stabilized steel projectile containing a high-explosive shaped charge and a brass cartridge case loosely filled with propellant. An inverted copper cone liner in the front of the projectile serves to shape the Composition B charge, and a streamlined windshield houses a piezoelectric element to initiate the point-initiating, base-detonating fuze in the base. An obturator band encircles the projectile above the lip of the cartridge case. An igniter and fin assembly is threaded into the base of the projectile and extends the length of the cartridge case through the propelling charge. The igniter is a perforated shaft filled with 400 grains of black powder. The four fixed fins are attached to the base of the assembly, and the igniter tube is closed with a threaded retainer containing approximately 20 grains of black powder. The percussion primer is, in turn, threaded into the retainer, flush with the base of the cartridge case, and contains seven grains of black powder. The interior of the cartridge case is fitted with guided rails for the projectile fins. A filling plug is threaded into the base of the cartridge case for filling the case with the propelling charge after cartridge assembly.

Functioning:

When the primer is struck by the firing pin of the weapon, the black powder is ignited through primer, retainer, and igniter to flash through the igniter perforations and ignite the propelling charge. Rapidly expanding gases from the burning propellant force the projectile through the gun barrel with a velocity of 2,800 feet per second. The obturator expands to prevent escape of gas pressure past the projectile while it is in the barrel, and the fins stabilize the projectile in flight. Upon impact with the target, distortion of the piezoelectric unit generates an electric current to initiate the fuze and

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detonate the explosive charge. As the copper cone is crushed, the detonation results in an intensely focused high velocity shock wave which causes failure of the target armor, and a jet of molten metal penetrates the target interior.

Difference Between Models:

The M348 has a cone tube extension which is not present in the M348A1. The fin cross-section of the M348 is rectangular while that of the M348A1 is T-shaped.

Tabulated Data:

Complete round:
- Type ---------- HEAT
- Weight ---------- 34.79 lb
- Length ---------- 33.74 in.
- Cannon used with ---------- M3, M36, T132, T133

Projectile:
- Body material ---------- Steel forging
- Color ---------- Olive drab w/black markings
- Filler and weight ---------- Comp B, 1.56 lb

Components:
- Cartridge case ---------- T27E2
- Propelling charge ---------- M6 (80 oz); M1 (87 oz)
- Primer ---------- T69
- Igniter, fin assembly ---------- T33E2
- Faze ---------- PIBD, M509A1

Performance:
- Maximum range ---------- 11,650 m (13,010 yd)
- Muzzle velocity ---------- 832 mps (2800 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F -40°C)
  - Upper limit ---------- +125°F (+52°C)
- Storage:
  - Lower limit ---------- -80°F (-62.2° C) (for period not more than 3 days)
  - Upper limit ---------- + 160°F (+71.1°C) (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 115.7 lb
- Dimensions ---------- 39-15/16 x 13 x 8-5/32 in.
- Cube ---------- 2.4 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C268
Assembly drawing number ---- 75-1-359

References:

TM 9-1300-251-20

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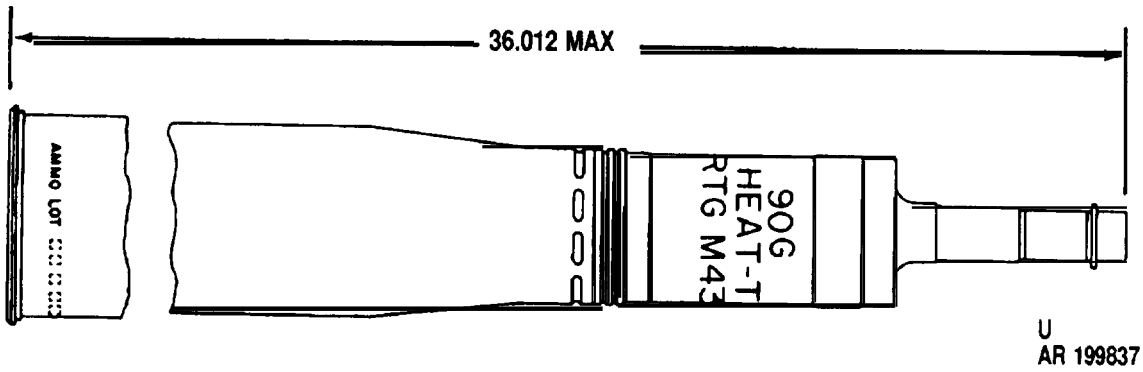
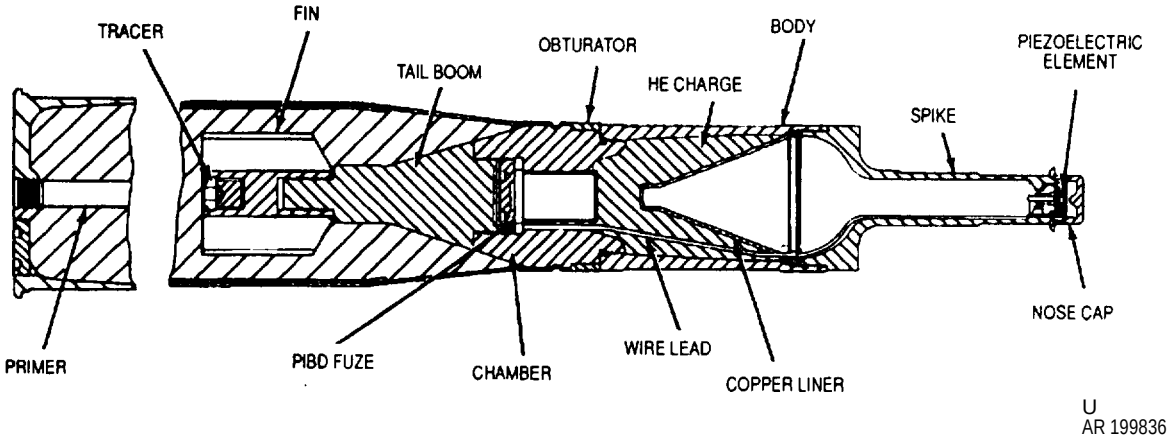
CARTRIDGE, 90 MILLIMETER: HEAT-T M431 (T300E59), M431A1 AND M431A2





Type Classification:

STD AMCTC 8823 dtd 1971.

Use:

This cartridge is intended for use in 90mm guns against armored targets.

Description:

The projectile consists of a steel body, a threaded stand-off spike assembly an aluminum chamber, and a fin and boom assembly. A funnel-shaped liner contained in the body shapes the high-explosive charge. The chamber adapts the fin and boom assembly to the body and contains the base-detonating fuze. The projectile is fitted with a plastic obturator band. The nose cap, containing a piezoelectric element, is fitted to the spike assembly. The tracer is threaded to the fin. The cartridge case base is fitted with a threaded loading plug and a percussion primer.

Functioning:

When the weapon is fired, the primer ignites the propelling charge. The burning propellant generates gases to propel the projectile out of the gun tube and ignites the tracer, which burns for a minimum of 2,500 yards. The projectile is detonated upon impact by fuze functioning. Upon detonation, the cone collapses creating an intensely focused high velocity shock wave and a jet of metal particles that penetrates the target.

Difference Between Models:

The M431A1 is similar to the M431 except that the cartridge case contains a wax-impregnated titanium dioxide (TiO_2) liner designed to reduce gun wear. A TiO_2 additive liner with high melt wax and a mylar barrier is used on the M431A2.

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Tabulated Data:

Complete round:
- Type ---------- HEAT-T
- Weight ---------- 33 lb
- Length ---------- 36 in.
- Cannon used with ---------- M36, M41 or M54

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/yellow marking
- Filler and weight ---------- Comp B, 1.2 lb

Components:
- Cartridge case ---------- M114A1
- Propelling charge ---------- M30, 8.25 lb
- Primer ---------- M79
- Tracer ---------- M13
- Faze ---------- PIBD-M509A1

Performance:
- Maximum range ---------- 8138 m (8900 yd)
- Muzzle velocity ---------- 1216 mps (4000 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F (M431 and M431A1); +140°F (M431A2)
- Storage:
  - Lower limit ---------- -65°F
  - Upper limit ---------- +125°F (M431 and M431A1); +145°F (M431A2)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 106 lb
- Dimensions ---------- 40-1/2 x 12.3/8 x 6-5/8 in.
- Cube ---------- 1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C294
Drawing number ---------- 8822481

Limitations:

Because of the low melting point of the waxin M431A1 cartridges, tank-transported cartridges that are exposed to temperatures above +120°F shall not be fired.

References:

AMC-P 700-3-3

TM 9-1300-251-20

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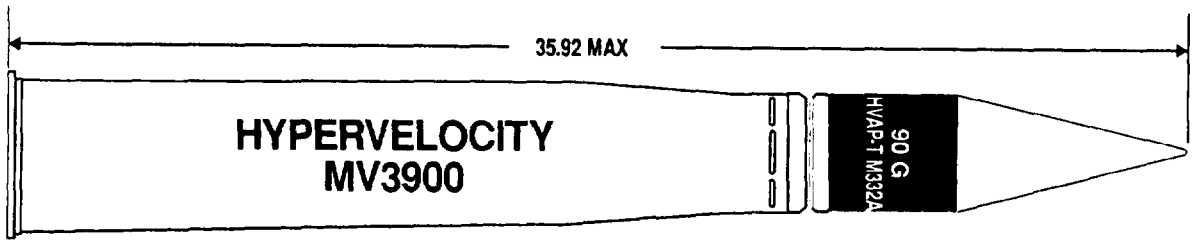
CARTRIDGE, 90 MILLIMETER: HVAP- M332A1



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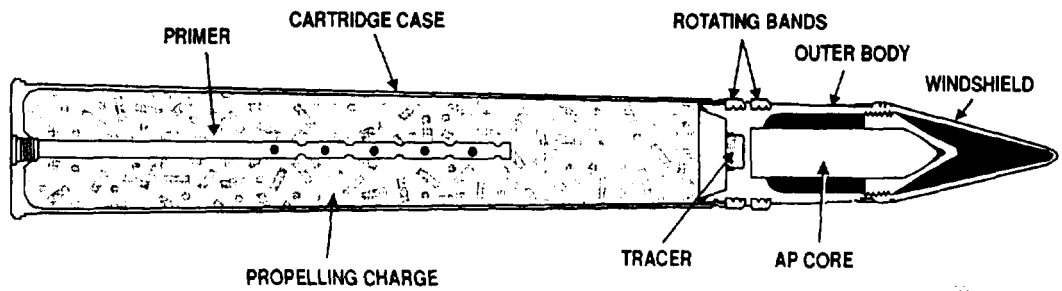

U
AR 199822

Type Classification:

CON MSR 11756003.

Use:

This high velocity armor-piercing cartridge is designed for use in 90mm guns against armored targets.

Description:

The projectile contains a hard armor-piercing core of tungsten carbide steel in an aluminum alloy outer body. The outer body is fitted with two sintered-iron rotating bands, a steel bourrelet, and an aluminum alloy windshield. The base of the body is skirted and contains a tracer. Modifications of the projectile are assembled with a sprayed base or steel base shield to counteract erosion. The cartridge case is loosely packed with propellant and is fitted with a percussion primer in the base.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. Upon impact, the outer shell crumples and the tungsten carbide core penetrates the target solely by kinetic energy.

Tabulated Data:

Complete round:

Type	HVAP
Weight	32.3 lb
Length	35.92 in.
Cannon used with	M36, M41 or M54

Projectile:

Body material	Tungsten carbide and aluminum alloy
Color	Black w/white marking

Components:

Cartridge case	M19, M19B1
Propelling charge	M17
Primer	M49
Tracer	M5A2B1

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Performance:
- Maximum range ---------- 14,456 m (15,700 yd)
- Muzzle velocity ---------- 1165 mps (3875 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- +40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 119 lb
- Dimension ---------- 42-7/16 x 12-15/16 x 8-3/32 in.
- Cube ---------- 2.6 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C270
Drawing number ---------- 75-1-310

Limitations:

This cartridge is not to be fired at temperatures below +40°F when loaded with M17 propellant.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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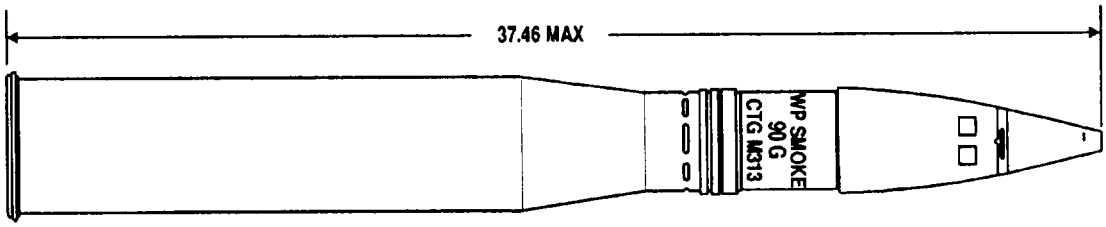
CARTRIDGE, 90 MILLIMETER: SMOKE, WP, M313 AND M313C



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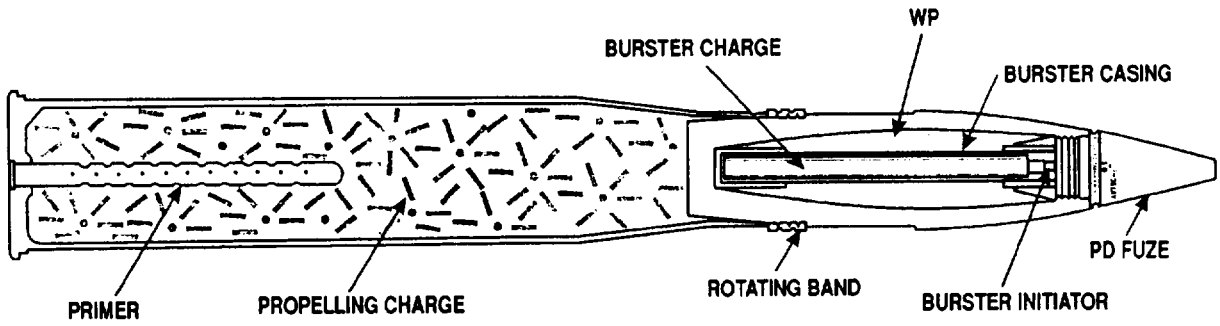
AR 199829



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AR 199828

Type Classification:

STD OTCM 37119 dtd 1959 (M313).
STD OTCM 37619 dtd 1960 (M313C).

Use:

This cartridge is used in 90mm guns for spotting and screening purposes and has a limited incendiary effect.

Description:

The projectile consists of a hollow steel forging with a boat-tailed base and streamlined ogive. The projectile nose is threaded to receive an adapter for the point-detonating fuze and to provide a seat for the burster casing assembly. The burster casing assembly a thin-walled steel tube containing the burster charge and burster initiator, extends from the adapter to the rear of the projectile cavity. The burster tube provides a tight seal for the charge of white phosphorous (WP).

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube. Upon impact, the point-detonating fuze functions igniting the burster initiator and detonating the burster charge. The projectile casing ruptures, dispersing the filler. WP ignites upon contact with the air, producing a dense white smoke and flaming particles.

Difference Between Models:

The M313C is identical to the M313 except for a different propellant charge which gives a lower muzzle velocity and a resultant reduction in gun wear.

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Tabulated Data:

Complete round:

	M313	M313C
Type	Smoke (WP)	Smoke (WP)
Weight	42.52 lb	40.52 lb
Length	37.44 in.	37.46 in.
Cannon used with	M36, M41 or M54	

Projectile:
- Body material: Steel
- Color: Gray w/yellow band and marking (green wired marking for later manufacture)
- Filler and weight: WP, 1.97 lb

Components:
- Cartridge case: M19, M19B1
- Propelling charge: (M313) M15, M6, 7.31 lb; (M313C) M1, 5.33 lb
- Primer: M49, M28B2
- Burster: M24, Tetrytol, 2.33 oz
- Burster initiator: M2
- Fuze: PD, M48A3, M57; MTSQ, M501 series

Performance:
- Maximum range: (M313) 17,717 m (19.375 yd): (M313C) 15,362 m (16,800 yd)
- Muzzle velocity: (M313) 821 mps (2700 fps); (M313C) 730 mps (2400 fps)

Temperature limits:
- Firing:
  - Lower limit: -40°F
  - Upper limit: +125°F
- Storage:
  - Lower limit: -65°F
  - Upper limit: +125°F

*Packing: 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight: 132 lb
- Dimensions: 43-5/8 x 13 x 8-5/32 in.
- Cube: 2.69 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C258
Drawing number	8858640

Limitations:

Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures exceeding + 125°F.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases so that if WP melts it will resolidify with void space in normal position in nose of projectile. Erratic performance may occur if voids exist inside the WP filler.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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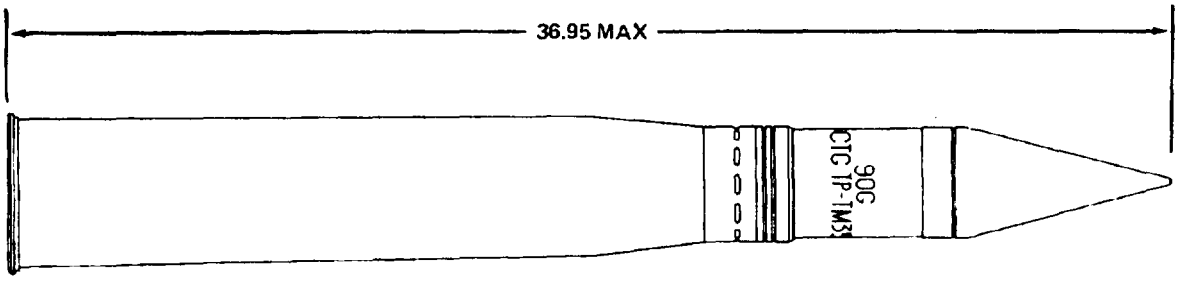
CARTRIDGE, 90 MILLIMETER: TP-T M353 (T22E1), M353A1 (M353E1) AND M353A2



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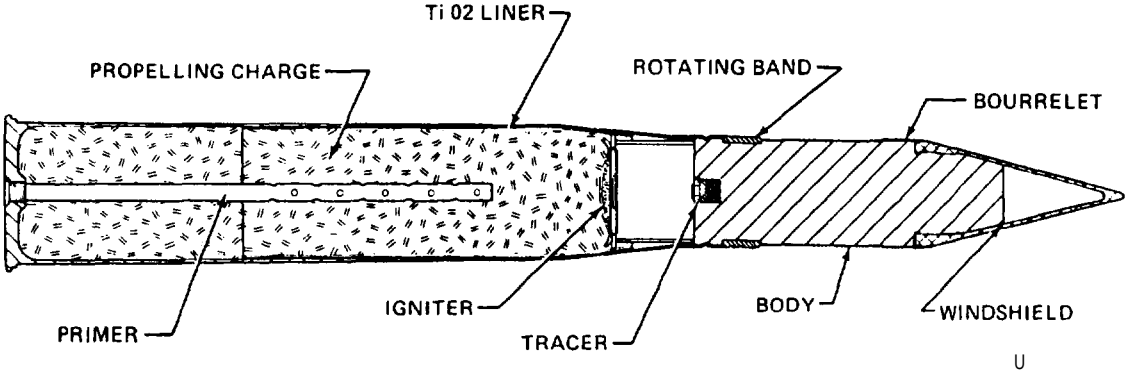

U
AR 199826

Type Classification:

OBS OTCM 37344 (M353).
STD AMCTC 4634 dtd 1966 (M353A1).
STD AMCTC 4634 dtd 1966 (M353A2).

Use:

This cartridge is used in 90mm guns for training and marksmanship practice.

Description:

The projectile is ballistically matched to AP-T Cartridge M318. The body is steel with an integral bourrelet and a gilding metal rotating band. The flat base is fitted with a tracer. An aluminum windshield is threaded to the nose. A percussion primer is fitted in the cartridge base.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. Since it is a practice round, the projectile-lacks the penetrating capability of a service round.

Difference Between Models:

M353 does not contain a cartridge case liner.

M353A1 contains TiO_2 liner with low temperature melt wax.

M353A2 contains TiO_2 liner with high temperature melt wax.

Tabulated Data

Complete round:

Type	TP-T
Weight	43.9 lb
Length	36.95 in.
Cannon used with	M36, M41 or M54

Projectile:

Body material	Steel
Color	Blue w/white marking

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Components:
- Cartridge case ---------- M108, M108B1
- Propelling charge ---------- M30 (T36), 8.6

- Primer ---------- M58
- Tracer ---------- M5A2, M5A2B1, M13

Performance:
- Maximum range ---------- 21,031 m (23,000 yd)
- Muzzle velocity ---------- 914 mps (3000 f p s)

Temperature limits:
- Firing:
  - Lowerlimit ---------- -65°F
  - Upper limit ---------- +120°F
- Storage:
  - Lower limit ---------- -65°F
  - Upper limit ---------- +120°F

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 129 lb
- Dimensions ---------- 44 x 12-7/8 x 8-1/8 in.
- Cube ---------- 2.64 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C290
Drawing number ---------- 8861603

Limitations:

Do not fire M353A1 rounds which have been tank transported at temperatures in excess of 120°F.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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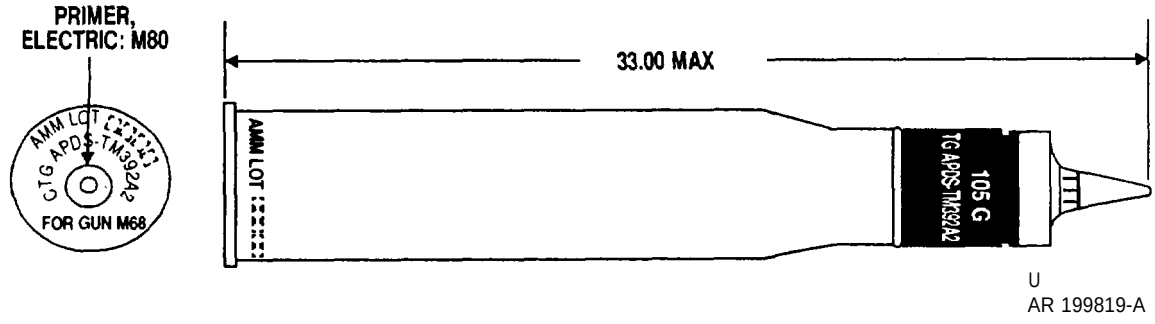
CARTRIDGE, 105 MILLIMETER: APDS-T, M392A2 AND M392



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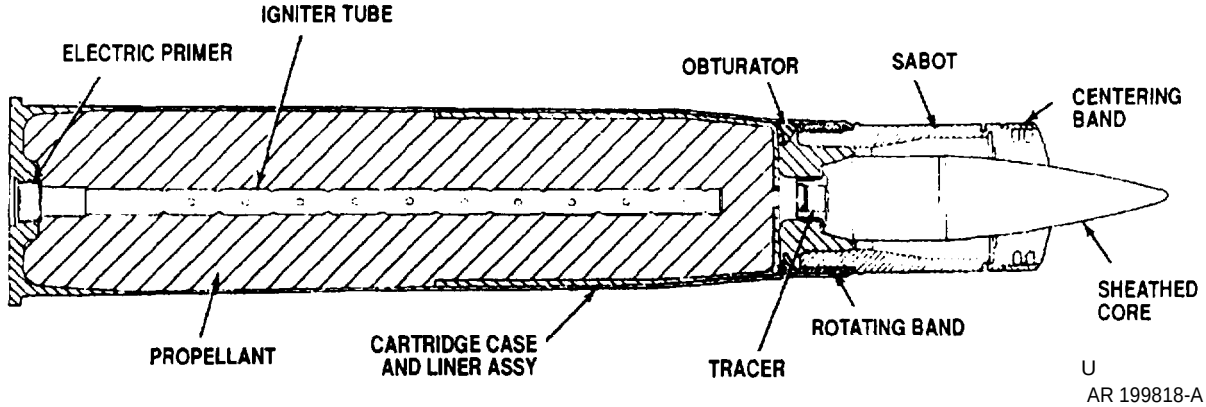
AR 199819-A



U
AR 199818-A

Type Classification:

STD MSR 02787001 (M392A2).
STD OTCM 38116 dtd 1961 (M392).

Use:

This cartridge is a hypervelocity armor-piercing type with discarding sabot, intended for use in 105mm guns against armored targets.

Description:

The projectile consists of a sheathed tungsten carbide core with tracer and a sabot. The core, which is the armor-piercing element, is carried within the sheath with the sabot assembled on the exterior surface. A plastic band is positioned on the outside diameter of the sabot at the forward end. A fiber rotating band and a rubber obturator are assembled on the outside diameter near the base of the sabot. The igniter tube of the electric primer extends almost the entire length of the propellant loosely packed in the cartridge case.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds. Setback, centrifugal, and air pressure forces cause the sabot to discard upon leaving the gun tube. The sheathed core is spin stabilized and penetrates the target solely by kinetic energy.

Difference Between Models:

The M392 is of United Kingdom manufacture and bears the U.K. designation of L36A1. The M392 is fitted with U.K. L4A1 or L4A2 primer.

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Tabulated Data:

Complete round:
- Type ---------- APDS-T
- Weight ---------- 41 lb
- Length ---------- 33 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Tungsten carbide core
- Color ---------- Black w/white marking

Components:
- Cartridge case ---------- M115, M115B1
- Propelling charge ---------- M30 (T36)
- Primer ---------- M80A1
- Tracer ---------- M13

Performance:
- Maximum range ---------- 36,745 m (40,162 yd)
- Muzzle velocity ---------- 1478 mps (4850 fps)

Temperature limits:
- Firing:
  - Lowerlimit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 126 lb
- Dimensions ---------- 39-7/8 x 14-1/8 x 8-23/32 in.
- Cube ---------- 2.8 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C505, C506
Drawing number ---------- 8863427

Limitations:

United Kingdom L28A1 cartridge, similar to the M392 except for its primer (L1A2, L1A3, or L1A4), is not to be fired in 105mm gun M68 except under combat emergency conditions. The clip will remain on the cartridge case at all times until the cartridge is partially chambered.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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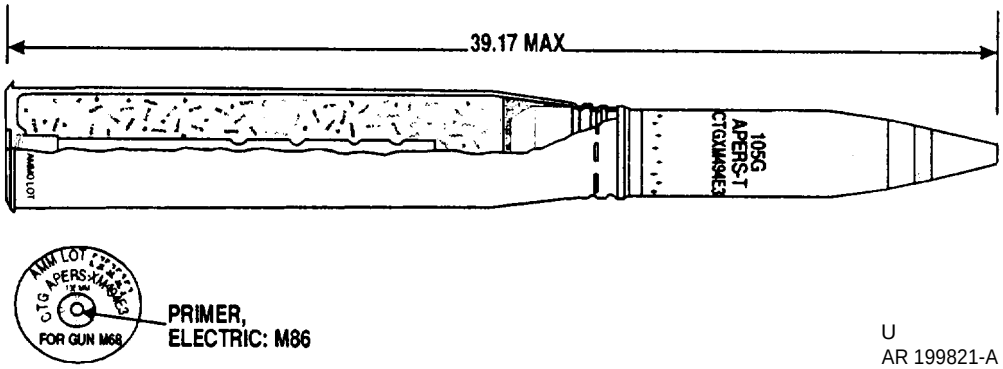
CARTRIDGE, 105 MILLIMETER: APERS-T, M494



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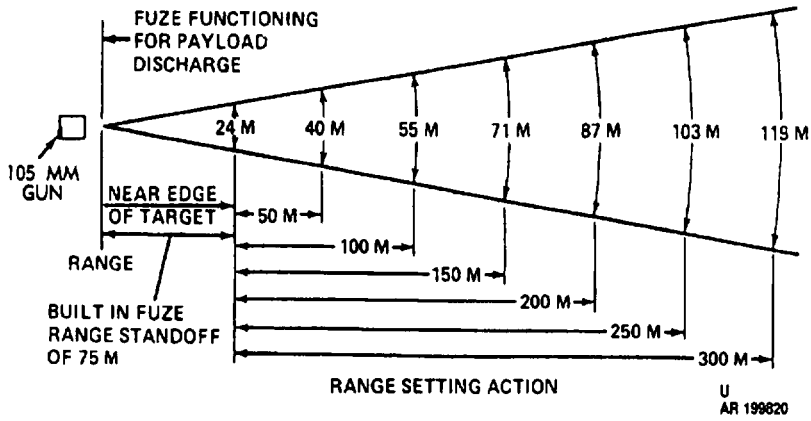

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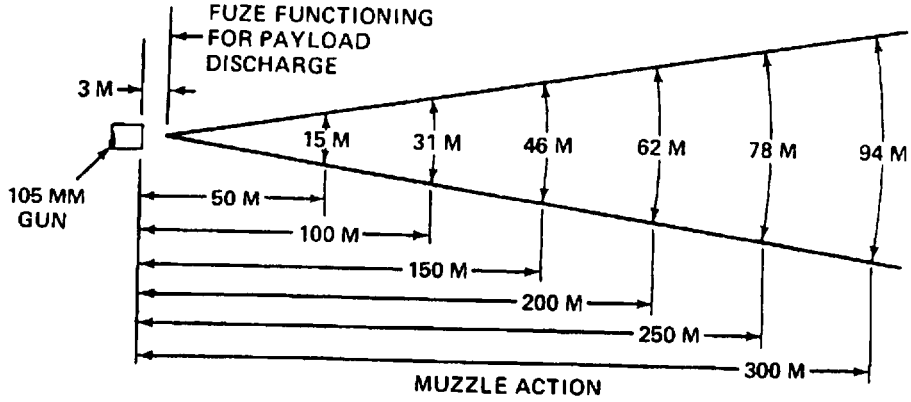
AR 199820



U
AR 199882

Type Classification:

STD AMCTC 9575 dtd 1972

Use:

This fixed cartridge is fired from 105mm gun cannon M68. The cartridge is designed for close-in defense against massed infantry assaults and for offensive tire against exposed enemy personnel, There is a secondary capability against light armor and low-flying aircraft.

Description:

The projectile casing consists of' a forward aluminum body and a rear steel base. A fuze adapter containing four detonators, a relay and detonator assembly, and a flash tube is fitted to the forward end of the body. The flash tube

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extends from the fuze adapter to the projectile base. Flechettes and a yellow dye marker are contained in the body of the projectile. The base of the projectile contains an expelling charge and a tracer. The cartridge case, fitted at the base with an electric primer, is crimped to the projectile. A mechnical-time fuze with muzzle action capability is used with this cartridge.

Functioning:

The electrically initiated primer ignites the propelling charge and tracer. Gases produced by the burning propellant propel the projectile from the gun. Concurrently with fuze functioning, the fuze detonator ignites the relay and the four detonators in the projectile. Upon functioning of the detonators, the forward portion of the projectile is ruptured releasing the flechettes and dye marker. Detonator flash follows the flash tube to ignite the expelling charge, and detonation of the expelling charge ejects the flechettes in the lower portion of the projectile. Flechettes are dispersed in a cone-shaped pattern, resulting from the forward force of the expelling charge and centrifugal force from projectile spin.

Tabulated Data:

Complete round:
- Type ---------- APERS-T
- Weight ---------- 55 lb
- Length ---------- 39.17 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Aluminum and steel
- Color ---------- Olive drab w/yellow band, white marking and white diamonds
- Filler and weight ---------- Flechettes, 9.2 lb

Components:
- Cartridge case ---------- M150B1
- Propelling charge ---------- M6, 9.2 lb
- Primer ---------- M86 electric
- Tracer ---------- M13
- Faze ---------- MT-M571

Performance:
- Maximum range ---------- 4400 m (4840 yd)
- Muzzle velocity ---------- 821 mps (2700 fps)
- Flechette range from point of fuze function ------ 300 m (330 yd)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -65°F
  - Upper limit ---------- +145°F

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 140 lb
- Dimensions ---------- 46-1/4 x 14-3/16 x 8-11/16 in.
- Cube ---------- 3.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C519
Drawing number ---------- 9229962

Limitations:

Firing the ammunition over the heads of exposed friendly troops is prohibited. When firing muzzle action, assure that personnel clear dispersion cone area and take cover.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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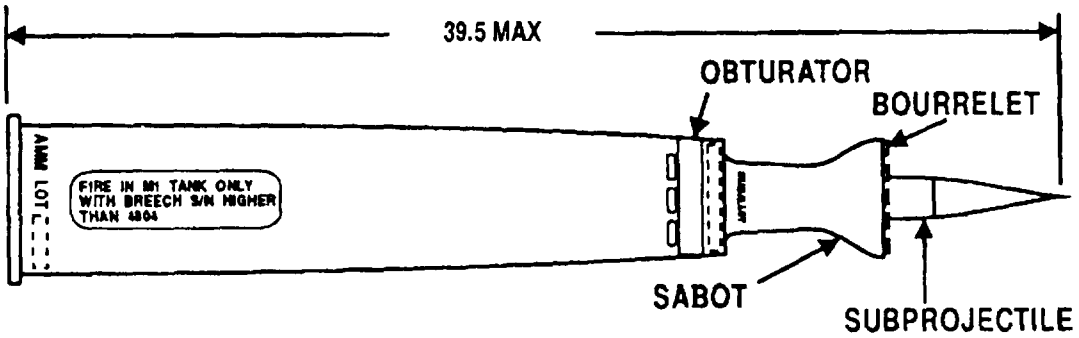
CARTRIDGE, 105 MILLIMETER: APFSD-T, M900



U
AR4815

Type Classification:

TC LRP Dec 1989.

Use:

This is a kinetic energy, armor-piercing antitank round intended for use with the 105mm, M68 series gun mounted on M1 tanks only.

Description:

The M900 is a U.S. designed and developed 105mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of an M148A1B1 steel cartridge case, an M43 LOVA propellant, an M128 primer, and a gun tube wear-reducing titanium dioxide liner which is assembled to the interior wall of the cartridge case. The projectile portion of the round consists of a subprojectile and a sabot. The subprojectile is made up of monolithic depleted uranium core, which is fitted with an aluminum windshield, a steel tip, and an aluminum fin assembly. The sabot is comprised of three 120° aluminum sections which are assembled around the subprojectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 tracer is assembled to the fin and is held in place by a threaded plug and disc assembly.

Functioning:

The M900 is loaded and fired from the M68 series, 105mm gun in the normal manner. Initiation of the electric primer ignites the propelling charge generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

Tabulated Data:

Complete round:
- Type ---------- Fixed, APFSDS-T
- Weight ---------- 40.8 lb (18.5 kg)
- Length ---------- 39.5 in. (100.4 cm)
- Assembly drawing ---------- 12910111
- Color ---------- Black w/white markings
- Projectile weight as fired ---- 15.1 lb (6.86 kg)
- Propellant ---------- 13.5 lb

Temperature limits:
- Firing:
  - Lower Limit ---------- -20°F (-28.9°C)
  - Upper Limit ---------- +120°F (+48.9°C)
- Storage:
  - Lower Limit ---------- -35°F (-37.2°C)
  - Upper Limit ---------- +145°F (+62.8°C)

Performance: ---------- 75 KSI @ 70°F
Velocity ---------- 1505 MPS

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Packaging (light weight container):
- Inner pack drawing ---------- N/A
- Outer pack drawing ---------- 12561500
- Weight (empty) ---------- 17 lb
- Dimensions ---------- 6.84 x 6.84 x 44.5 in.
- Cube (ft) ---------- 1.2 cu ft
- *Packing ---------- one round per light weight metal container: 30 containers per metal pallet

Pallet (w/30 containers):
- Weight (empty) ---------- 1033 lb
- Dimensions ---------- 44-1/2 x 42 x 39 in.
- Cube ---------- 42.2 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (04) 1.2
Storage compatibility group --- C
DOT shipping class ---------- A

NOTE: Some quantities of M900 primers are marked "XM128". The "X" marking is to be disregarded, XM128 primers are the same as type classified M128 primers.

DOT container marking -------- CARTRIDGES FOR WEAPONS, INERT PROJECTILE AND DOT E-9649
DODAC ---------- 1315-C543
NSN---------- 1315-01-324-6633
Drawing number ---------- 12910111

Limitations:

Projectile is not to be disposed of by burning or detonation.

NOTE

Loss or unauthorized firings of the M900 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery. Report to:

CDR USA AMCCOM
ATTN: AMSMC-SF (RPO)
Rock Island, IL 61299-6000
DSN: 793-2969/2964/2965/2966
Commercial: (309)782-2961/2965
782-2964/2966

The M900 is a full service round which may only be fired during war emergency. All peacetime firings are prohibited except on ranges which are Nuclear Regulator Commission (NCR) approved and/or have host nation agreement. The M900 will not be fired over the heads of friendly troops unless troops are protected by adequate cover. Troops may be struck by the discarded sabot.

WARNING

- **THE M900 IS AUTHORIZED FOR USE IN M1 TANKS ONLY. FIRING THE M900 FROM ANY OTHER 105MM TANK SYSTEM MAY RESULT IN THE FAILURE OF THE GUN MOUNT. FIRING THE M900 IN UNAUTHORIZED GUN MOUNTS WILL RESULT IN FAILURE OF THE RECOIL MECHANISM HYDRAULIC SEALS.**

- **DO NOT FIRE THE M900 FROM 105MM, M68 SERIES CANNON EQUIPPED WITH BREECHES HAVING SERIAL NUMBERS LOWER THAN 4804. BREECHES WITH SERIAL NUMBERS LOWER THAN 4804 CAN FAIL CATASTROPHICALLY WITHOUT WARNING. INITIAL QUANTITIES MAY BE STENCILED WITH A NOTE INDICATING A CUTOFF POINT FOR THE BREECHES AT SERIAL NUMBER 6000. THIS NUMBER SHOULD NO LONGER BE CONSIDERED VALID.**

- **DO NOT FIRE M900 CARTRIDGES WHERE THE PROJECTILE IS LOOSE WITHIN THE CARTRIDGE CASE; I. E., ROTATING, WOBBLING, RATTLING, OR ANY OTHER UNSECURED MANNER. THIS CONDITION MAY RESULT IN EXCESSIVE PRESSURE WHILE FIRING RESULTING IN CATASTROPHIC BREECH FAILURE.**

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- **HATCHES MUST REMAIN CLOSED AND THE TURRET VENT BLOWER MUST REMAIN ON WHEN FIRING TO PREVENT BUILDUP OF TOXIC GAS (CARBON MONOXIDE). CREW MEMBERS ARE REQUIRED TO WEAR SINGLE HEARING PROTECTION (COMBAT CREWMEN HELMET) DURING ALL M900 FIRING. OBSERVERS ON THE GROUND SHOULD STAY BEHIND THE TANK AND WEAR DOUBLE HEARING PROTECTION DURING MAIN TANK WEAPON FIRING.**

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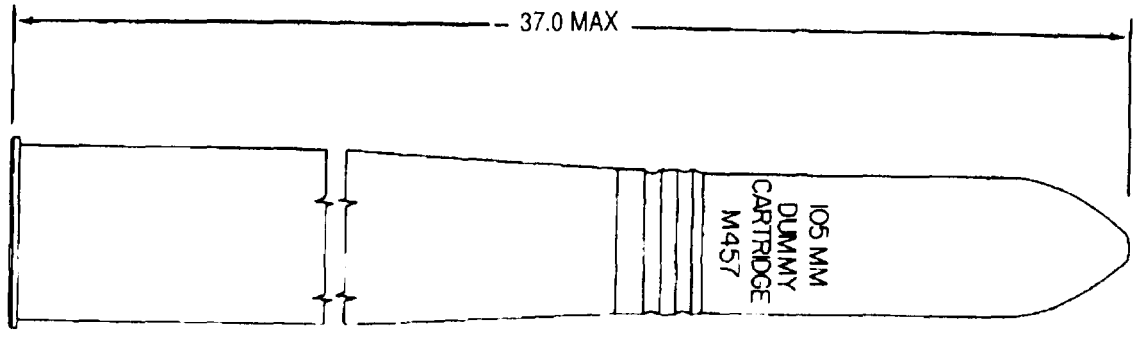
CARTRIDGE, 105 MILLIMETER: DUMMY, M457



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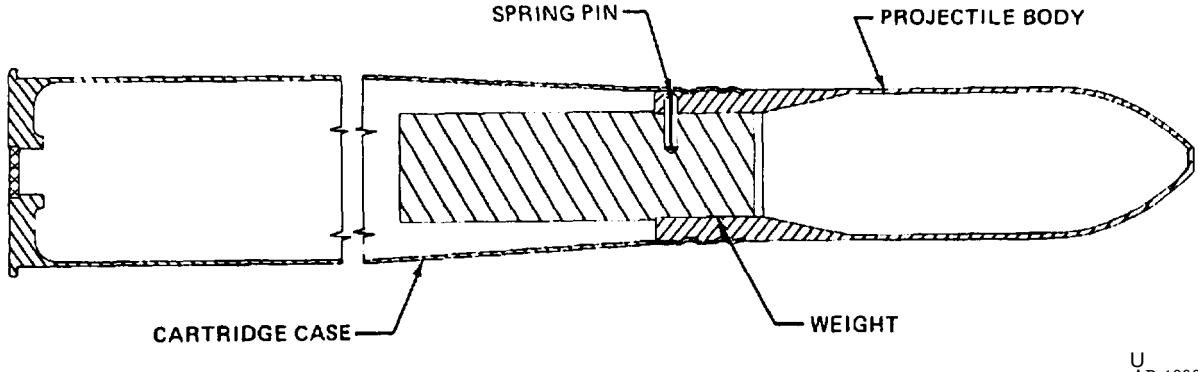

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Type Classification:

STD AMCTC 639 dtd 1962.

Use:

This dummy cartridge is used as a drill round to train tank crews in handling ammunition and loading the 105mm gun cannon.

Description:

The cartridge simulates a loaded round of 105mm high-explosive plastic ammunition in size, weight, and center of gravity. The projectile is of steel, and is secured to the cartridge case by crimping. A steel weight is assembled to the rear of the projectile and is held in place with a spring pin.

Functioning:

The cartridge is completely inert and does not function.

Tabulated Data:

Complete round:
- Type ---------- Dummy
- Weight ---------- 44 lb
- Length ---------- 37 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white marking (unpainted on bronze body for later manufacturer)

Components:
- Cartridge case ---------- M148A1B1
- Propelling charge ---------- N/A
- Primer ---------- N/A

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*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	137 lb
Dimensions	43-1/2 x 14 x 8-1/2 in.
Cube	3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	NON-EXPLOSIVE AMMUNITION
DODAC	1315-C514
Drawing number	10534154

References:

AMD-P 700-3-3
SB 700-20
TM 9-1300-251-20

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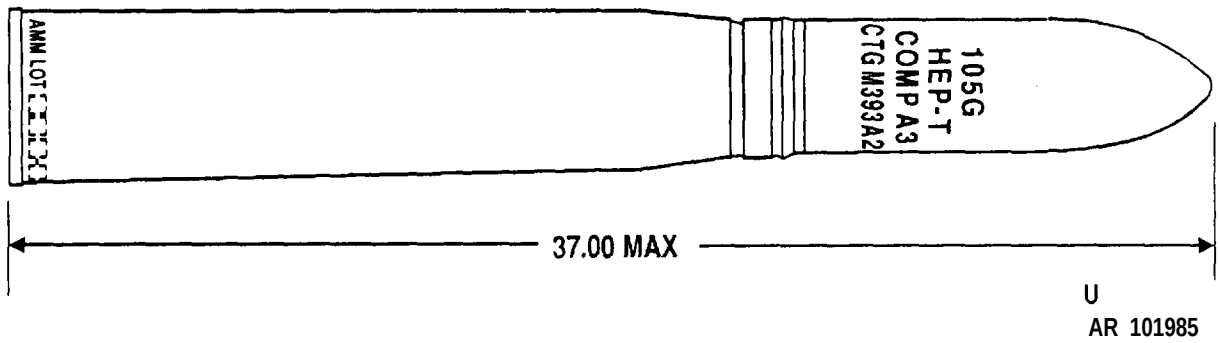
CARTRIDGE, 105 MILLIMETER: HEP-T, M393A2 AND M393A1



Type Classification:

STD AMCTC 3325 dtd 1965.

Use:

This cartridge is designed for use against armored targets, light materiel, and personnel.

Description:

The cartridge carries a payload of 6.6 pounds of Composition A3, a high-explosive plastic composition. The projectile is a thin-walled cylinder with a relatively short ogive and a flat base. The base of the projectile is fitted with a base-detonating (BD) fuze and a tracer. The projectile is assembled to a brass (or steel) cartridge case fitted with an electric primer and containing a bagged propelling charge.

Functioning:

When the weapon is fired, the electrically initiated primer ignites the propelling charge. The burning propellant ignites the tracer and creates gases which force the projectile out of the gun tube and propels it to the target. Upon impact, the fuze functions initiating the explosive filler.

Difference Between Models:

The M393A1 differs from the M393A2 in that the M393A1 employs the BD fuze M534 while the M392A2 employs the BD fuze M578. The filler weight on the M393A1 is 0.3 pounds less.

Tabulated Data:

Complete round:
- Type ---------- HEP-T
- Weight ---------- 45 lb
- Length ---------- 37 in

Projectile:
- Filler ---------- M68
- Explosive (393A2) ---------- Comp A, 6.6 lb
- Explosive (393A1) ---------- Comp A, 6.3 lb
- Body materiel ---------- Steel
- Color ---------- Olive drab w/ yellow markings and black band

Components:
- Cartridge case ---------- M150B1 (steel); M150 (brass)
- Propellant ---------- Ml, 5.9 lb
- Primer (electric) ---------- M86
- Tracer ---------- M12

Performance:
- Maximum range ---------- 9510 m (10,400 yd)
- Muzzle velocity ---------- 2400 m (731.5 mps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- + 160°F (for period not more than 4 hr/day)

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*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
Weight (w/2 ctgs)---------- 137 lb
Dimensions OD---------- 43-1/2 x 14 x 8-1/2 in.
Cube ---------- 3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0006
Quantity-distance class --------- 1.1
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C429; 1315-C518
Drawing number ---------- M393A2 8886470 M393A1-8853735

References:

AMC-P 700-3-3
SB 700-20

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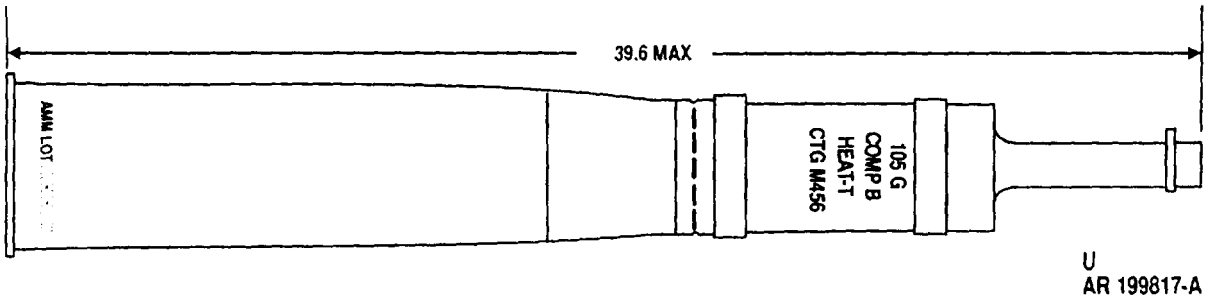
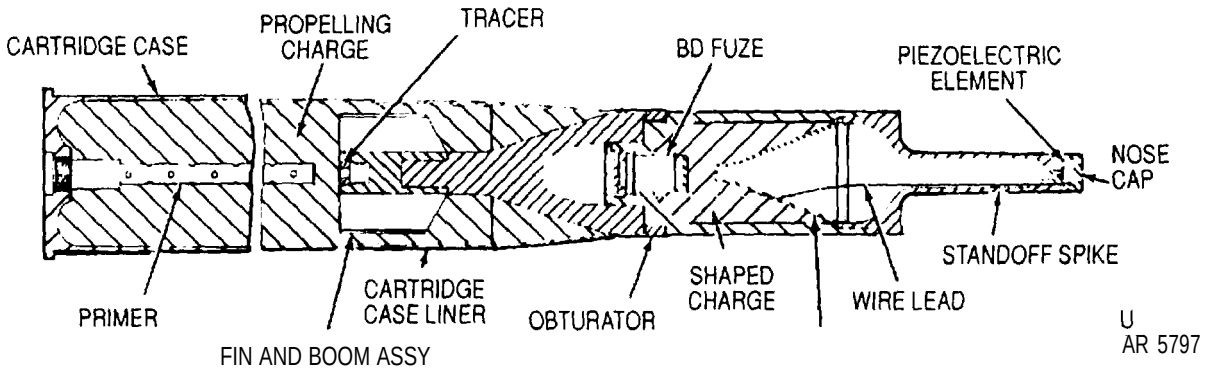
CARTRIDGE, 105 MILLIMETER: HEAT-1; M456 SERIES





Type Classification:

STD AMCTC 4677 dtd 1966 (M456A1),
OBS MSR 11756003 (M456).

Use:

This cartridge is a high-explosive antitank cartridge and is intended for use in 105mm guns against armored targets.

Description:

The steel body projectile is fitted with a plastic obturator, a threaded standoff spike assembly, a fin and boom assembly, and a point-initiating point-detonating fuze. A funnel-shaped copper liner within the body shapes the explosive charge of Composition B. A piezoelectric element retained in a nose cap is fitted to the spike assembly, and is connected to the base-detonating fuze in the body, The fin is threaded to receive a tracer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds. Upon impact, fuze functioning detonates the projectile and the cone collapses, creating a high velocity focused shock wave and a jet of metal particles that penetrates the target.

Difference Between Models:

The three models in the M456 series differ in the use of cartridge case liners. The M456.41 has a cloth liner coated on one side with a wax-titanium dioxide admixture covered with mylar film. The M456E1 has a similar liner without the mylar film. The M456 has no liner. The M456A1 also differs from other models in the series in that all projectile bodies manufactured after August 1967 entirely enclose the fuze. Earlier M456A1 production, as well as all M456E1 and M456 models, are assembled with an aluminum chamber.

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Tabulated Data:

Complete round:	
Type	HEAT-T
Weight	48lb
Length	39.6in.
Cannon used with	M68
Projectile:	
Body material	Steel
Color	Black w/white markings and yellow band
Filler and weight	CompB, 2.14 lb
Components:	
Cartridge case	M148A1B1
Propellant	M30
Primer	M83
Tracer	M13
Fuze	PIBD-M509A1
Performance:	
Maximum range	8200 m (8975 yd)
Muzzle velocity	1173 mps (3850 fps)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+140°F
Storage:	
Lower limit	-65°F
Upper limit	+145°F
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	132 lb
Dimensions	45-13/16 x 14-3/16 x 8-25/32 in.
Cube	3.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C508
Drawing number	8861065

Limitations:

Do not fire M456El cartridges which have been tank transported at temperatures above 120°F

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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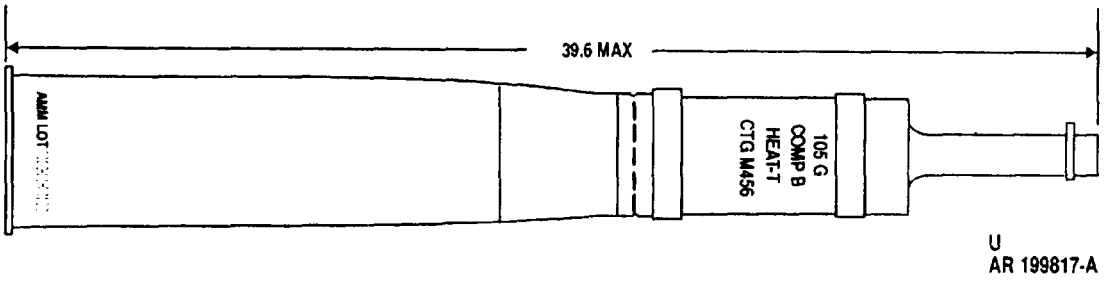
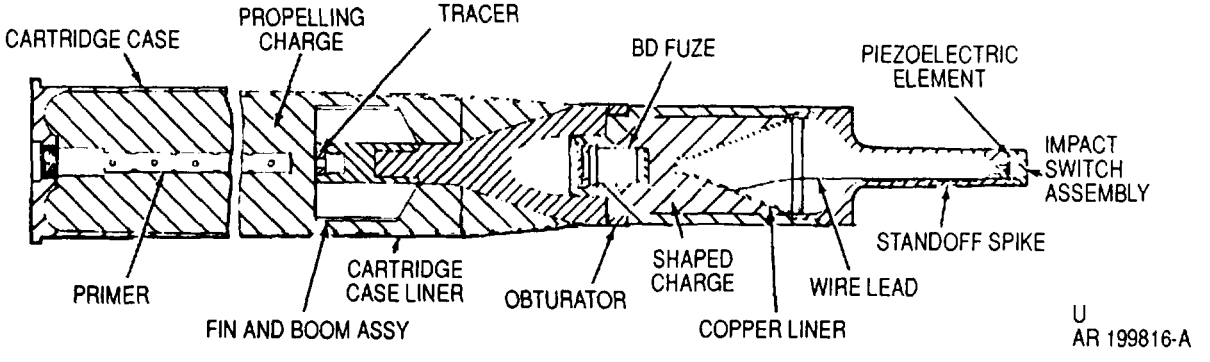
CARTRIDGE, 105 MILLIMETER: HEAT-T-ME M456A2





Type Classification:

Recommended STD by General Offcers Review, 3 June 1980.

Use:

This cartridge is a high-explosive antitank cartridge and is intended for use on 105mm guns M68 against armored targets.

Description:

The steel body of the projectile is fitted with a plastic obturator and seal, a threaded standoff spike assembly covered by an impact switch assembly (held in place with a collar), a tin and boom assembly and a point-initiating point-detonating fuze. A funnel-shaped copper liner within the body shapes the explosive charge of Composition B. A power supply retained by the impact switch assembly is fitted to the spike assembly, and is connected to the base-detonating fuze in the body. The addition of the impact switch assembly provides for a higher functioning reliability in that initiation can occur upon contact with any part of the standoff spike assembly, i.e., improved performance on irregular surfaces and graze functioning. The fin is threaded to receive a tracer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds. Upon impact, fuze functioning detonates the projectile and the cone collapses, creating a high velocity focused shock wave and a jet of metal particles that penetrate the target.

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Difference Between Models:

M456	M456E1	M456A1	M456A2
No cartridge case liner	Cartridge case liner with wax titanium dioxide on one side	Cartridge case liner with wax titanium dioxide covered with mylar	Same as M456A1
Aluminum chamber (base of projectile body)	Aluminum chamber (base of projectile body)	Early production and aluminum chamber body (After Aug 67 enclose)	Collar ring to retain impact switch assembly (FFAIS - Full Frontal Area Impact Switch)

Tabulated Data:

Complete round:
- Type ---------- HEAT-T
- Weight ---------- 49 lb
- Length ---------- 39.6 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/yellow markings
- Filler and weight ---------- Comp B, 2.14 lb

Components:
- Cartridge case ---------- M148A1B1
- Propellant ---------- M30
- Primer ---------- M83
- Tracer ---------- M13
- Fuze ---------- PIBD-M509Al

Performance:
- Maximum range ---------- 8200 m (8975 yd)
- Muzzle velocity ---------- l173mps (3850 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-400C)
  - Upper limit ---------- +125°F (+52.O°C)
- Storage:
  - Lower limit ---------- -65°F (-53.8°C)
  - Upper limit ---------- +145°F (+63°C)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 141 lb
- Dimensions ---------- 45-13/16 x 13-15/16 x 8-7/16 in.
- Cube ---------- 3.1 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315 -C508
Drawing number ---------- 9312816

Limitations:

Firing this cartridge over the heads of friendly troops is prohibited, unless troops are protected by adequate cover. This limitation is based upon the possibility of an airburst downrange.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-250
TM 9-1300-251-20
TM 9-1300-251-34

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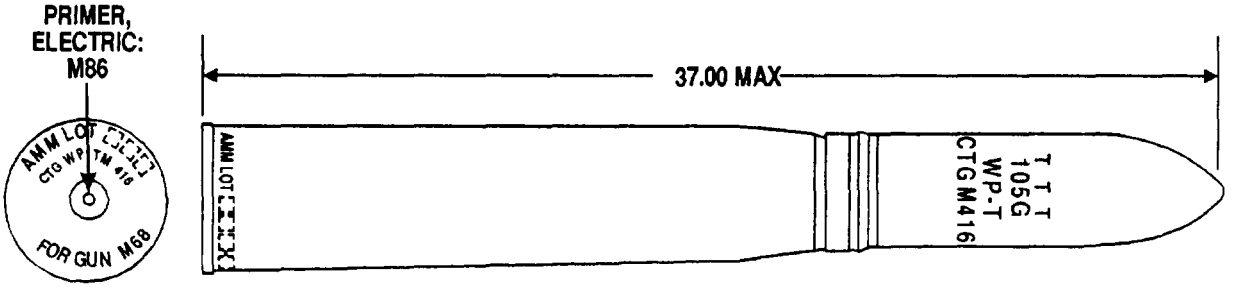
CARTRIDGE, 105 MILLIMETER: SMOKE, W-T, M416



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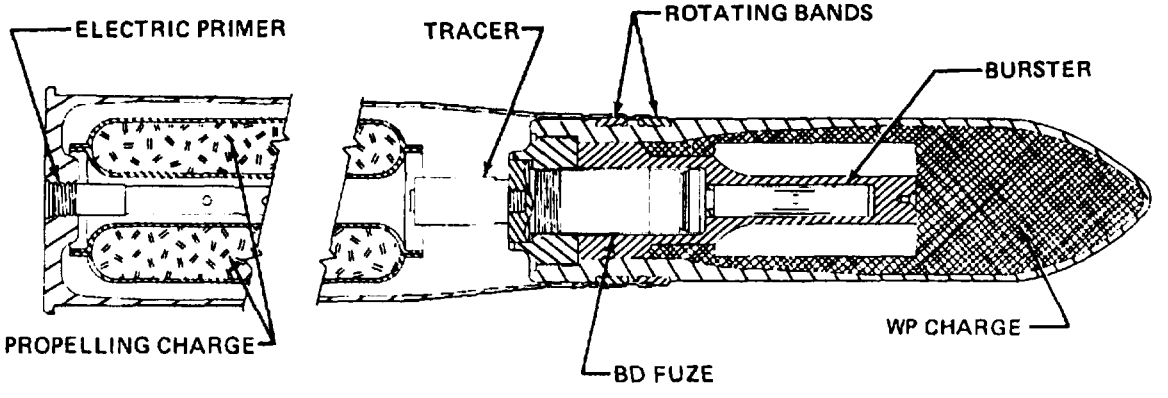

AR1W814

Type Classification:

STD AMCTC 2173 dtd 1964.

Use:

This cartridge is intended for screening and spotting fire from 105mm gun cannons. There is some limited incendiary effect.

Description:

The thin walled projectile is cylindrical in shape with a relatively short ogive and is fitted with two gilding metal rotating bands. The projectile is loaded with white phosphorous (WP), and has a base-detonating fuze and an extended tracer. The shell contains a centrally oriented burster of Composition B. To increase in flight stability at temperatures above + 110°F the burster casing is machined with a six-bladed impeller which extends into the WP filler. The cartridge case contains bagged propellant and is equipped with an electric primer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of six seconds. Upon impact, the fuze functions and detomates the burster charge which ruptures the projectile and clisperses the WP filler. Upon contact with the air, WP ignites producing a dense cloud of smoke.

Tabulated Data:

Complete round:

Type	Smoke WP-T
Weight	45.5 lb
Length	37 in.
Cannon used with	M68

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Projectile:
- Body material ---------- Steel
- ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 6 lb

Components:
- Cartridge case ---------- M150B1, M150
- Propellant ---------- Ml
- Primer ---------- M86
- Tracer ---------- M12
- Burster ---------- M48
- Fuze ---------- BD,M534

Performance:
- Maximum range ---------- 9150 m (10,000 yd)
- Muzzle velocity ---------- 730 mps (2400 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than3 days)
  - Upper limit ---------- +160°F (for period not more than 4hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 137 lb
- Dimensions ---------- 43-1/2 x 14 x 8-1/2 in.
- Cube ---------- 3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
Quantity-distance class --------- (12) 1.2
Storage compatibility group--- H
DOT shipping class ---------- A
DOT designayion ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C512
Drawing number ---------- 8886487

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside the WP filler.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20
TM 9-2350-311-10

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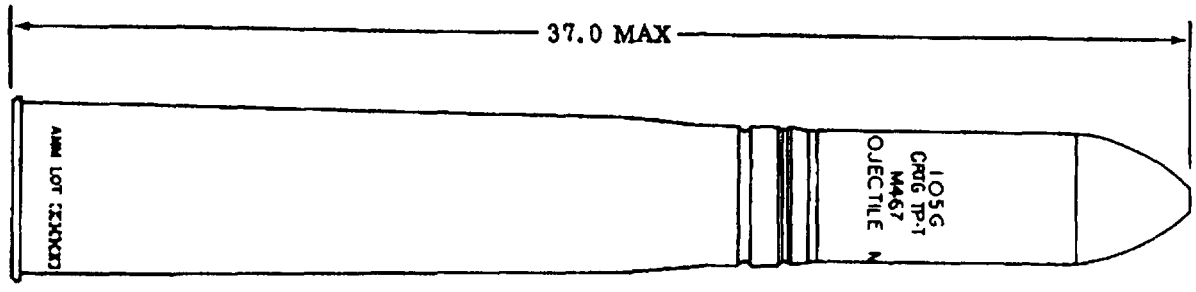
CARTRIDGE, 105 MILLIMETER: TP-T, M467



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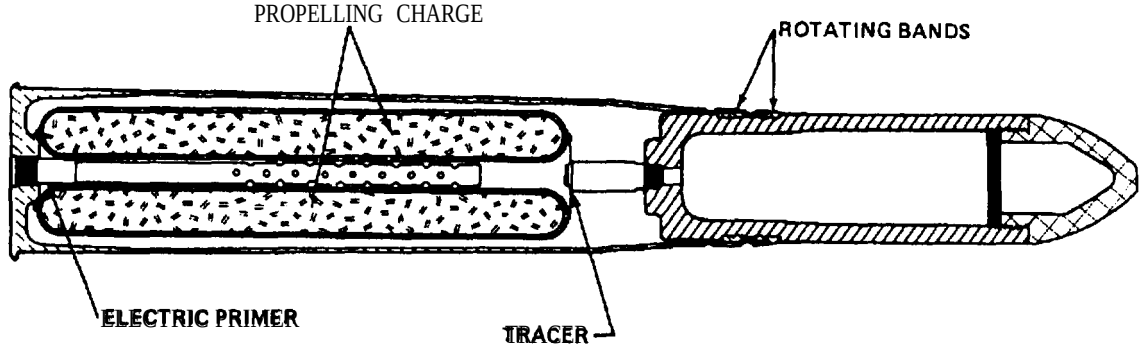

AR1981O

Type Classification:

STD MSR 0173625 dtd 1973,

Use:

This cartridge is for use in 105mm gun cannons for training in marksmanship.

Description:

The cartridge is similar in appearance and ballistically similar to high-explosive plastic service rounds. The projectile consists of a steel body and it fitted with a tracer. The cartridge case contains bagged propellant and is equipped with an electric primer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2,5 seconds.

Tabulated Data:

Complete round:

Type	TP-T
Weight	45 lb
Length	37 in.
Cannon used with	M68

Projectile:

Body material	Steel
Color	Blue w/white marking

Components:

Cartridge case	M150B1, M150
Propelling charge	Ml
Primer	M86
Tracer	M12

Performance:

Maximum range	9510 m (10,400 yd)
Muzzle velocity	730 mps (2400 fps)

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Temperature limits:

Firing:
- Lower limit ---------- 40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (-71.1°C) (for period not more than 4 hr/day

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 137 lb
- Dimensions ---------- 43-1/2 x 14 x 8-1/2 in.
- Cube ---------- 3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ----------	0328
Quantity-distance class ---------	(08) 1.2
Storage compatibility group ---	C
DOT shipping class ----------	
DOT designation ----------	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC ----------	1315-C510
Drawing number ----------	8863618

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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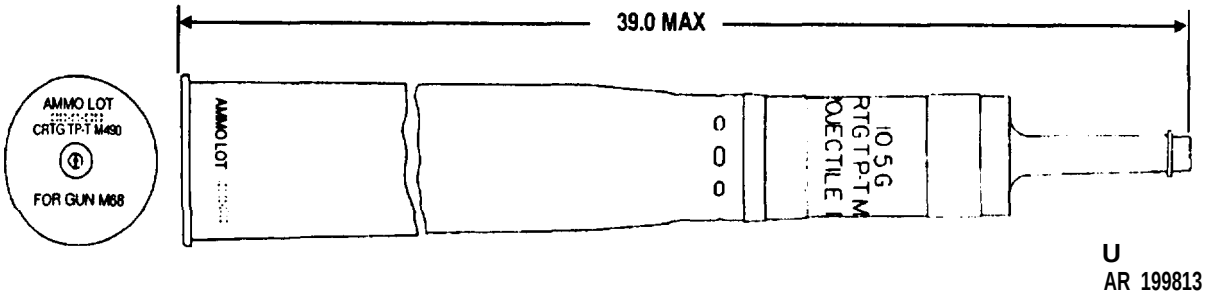
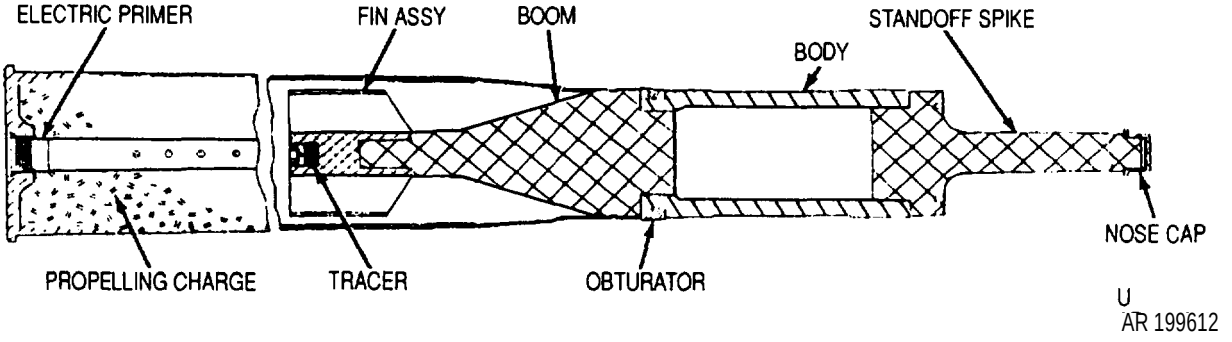
CARTRIDGE, 105 MILLIMETER: TM490





Type Classification:

STD AMCTC 1103 dtd 1963.

Use:

This cartridge is for use in 105mm gun cannons for training in marksmanship.

Description:

The cartridge is similar in external appearance and ballistically similar to HEAT-T cartridge M456 series. The projectile consists of a steel body, an aluminum standoff spike, and a boom and fin assembly with tracer. The cartridge case is filled with loosely packed propellant and is fitted with an electric primer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds.

Tabulated Data:

Complete round:
- Type ---------- TP-T
- Weight ---------- 45 lb
- Length ---------- 39 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white marking

Components:
- Cartridge case ---------- M148A1B1, M148A1
- Propelling charge ---------- M30
- ---------- M83
- Tracer ---------- M13

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Performance:
- Maximum range ---------- 8207 m (8975 yd)
- Muzzle velocity ---------- 1170 mps (3850 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +125°F (+52.O°C)
- Storage:
  - Lower limit ---------- -80°F (-62.2°C) (for period not more than 30 days)
  - Upper limit ---------- +160°F (71.1°C) (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 132 lb
- Dimensions ---------- 45-7/8 x 14-1/4 x 8-3/4 in.
- Cube ---------- 3.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (04) 1.2
Storage compatibility group --- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC ---------- 1815-C511
Drawing number ---------- 8865533

Limitations:

M490 cartridges manufactured prior to January 1967 have a cartridge case liner which utilizes a low-melt wax. Do not fire cartridges which have been tank transported at temperatures above + 120°F (+49°C).

References:

AMC-P 700-3-3

TM 9-1300-251-20

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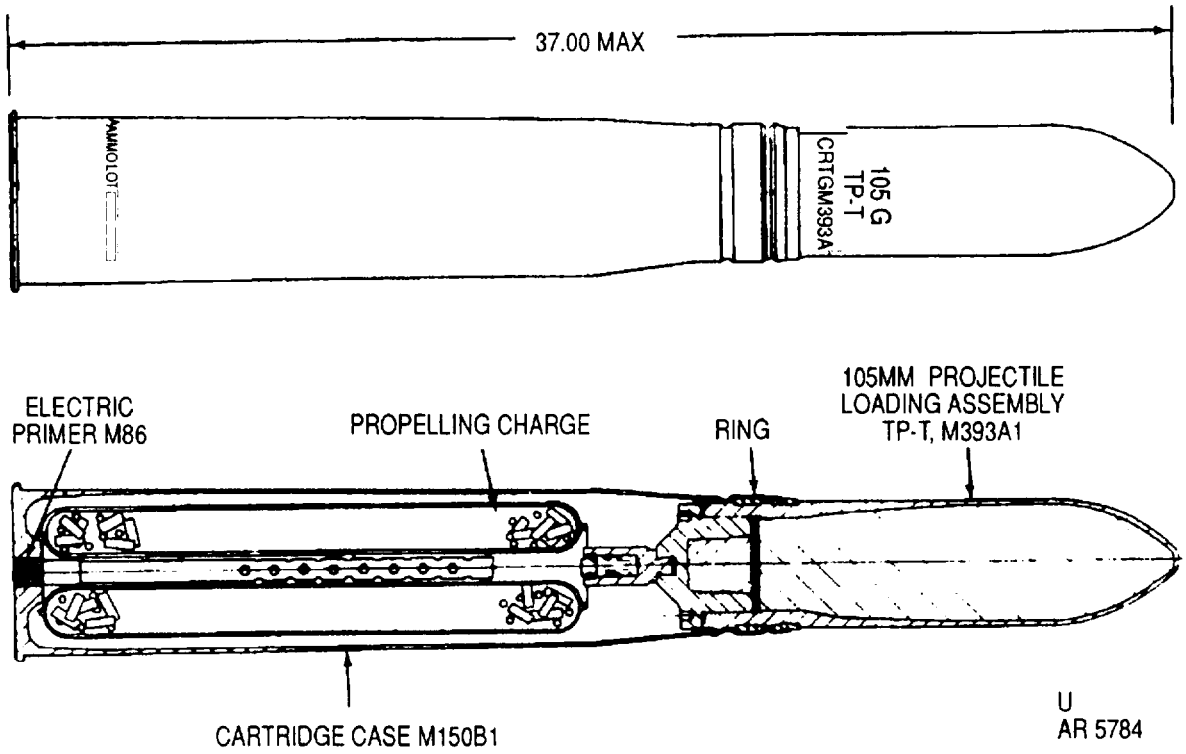
CARTRIDGE, 105 MILLIMETER: TP-T, M393A1



Type Classification:

STD.

Use:

This cartridge is for use in 105mm gun cannons for training in marksmanship.

Description:

The cartridge is similar in appearance and is ballistically matched to the high-explosive plastic round M393A1 and M393A2. The projectile is filled with inert material and has a tracer at the base. The projectile is assembled to a steel cartridge case fitted with the same model (M86) electric primer as the service round and contains the same type bagged propelling charge.

Functioning:

When the weapon is fired, the electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer, enabling the gunner in tracking the target.

Tabulated Data:

Complete round:
- Type ---------- TP-T
- Weight ---------- 45 lb
- Length ---------- 37 in.
- Cannon used with ---------- M68

Projectile:
- Type of filler ---------- E (inert)
- Body material ---------- Steel
- Color ---------- Blue w/white markings

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Components:
- Cartridge case ---------- M150B1 (steel)
- Propellant ---------- Ml (5.9 lb)
- Primer (electric) ---------- M86
- Tracer ---------- M12

Performance:
- Maximum range ---------- 9510 m (10,400 yd)
- Muzzle velocity ---------- 731.5 mps (2400 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight (w/2 ctgs)---------- 137 lb
- Dimensions OD---------- 43-1/2 x 14 x 8-1/2 in.
- Cube ---------- 3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distanceclass ---------- (08) 12
Storage compatibility group ---- C
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE
DODAC ---------- 1315-C503
Drawing number ---------- 9335943

References:

SB 700-20

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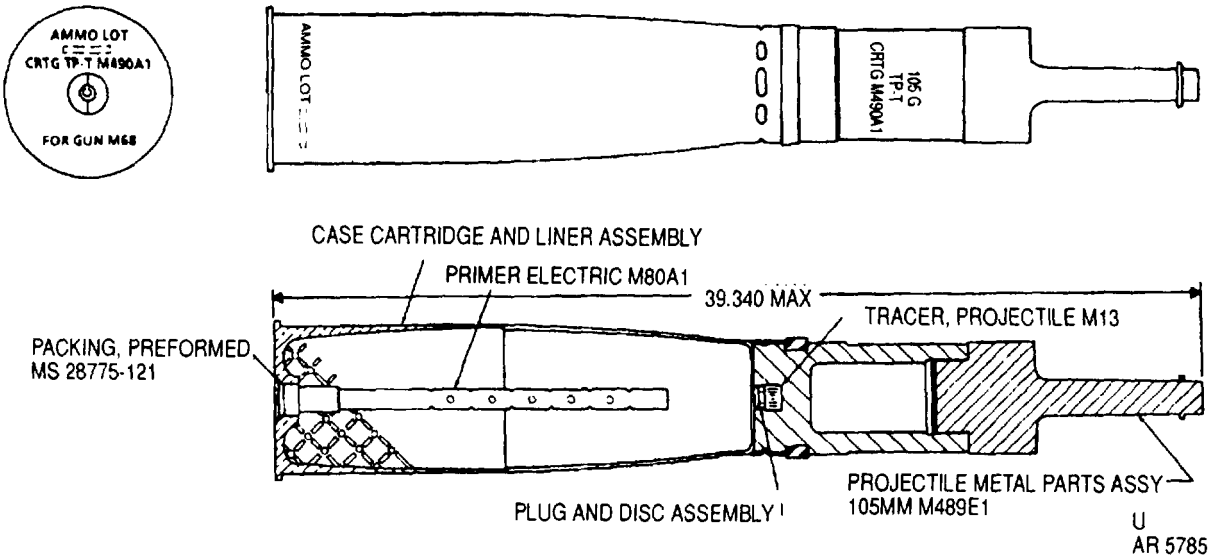
CARTRIDGE, 105 MILLIMETER: TP-T, M490A1



Type Classification:

STD MSR 06846011.

Use:

This cartridge is for use in 105mm tank cannon M68 for training in marksmanship.

Description:

The cartridge is the same in external appearance as the basic M490. However, internally it differs from the M490 in that the projectile has no fin assembly and is static stabilized. The projectile body is one inch longer. Some M490A1's may be assembled with the spiral-wrapped cartridge case. The standoff spike is steel, not aluminum, and the obturator has no seal.

The propellant in the cartridge case is the M14 and not the M30 as in the M490 cartridge. The cartridge case is fitted with the electric primer M80A1 instead of the M83.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds.

Tabulated Data:

Complete round:
- Type ---------- TP.T
- Weight ---------- 45.81 lb
- Length ---------- 39.34 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white markings

Components:
- Cartridge case ---------- M148A1B1, M148A2B1*
- Propelling charge ---------- M14
- Primer ---------- M80A1
- Tracer ---------- M13
- Fuze ---------- N/A

Performance:
- Maximum range ---------- 8975 yd
- Average velocity ---------- 3850 fps

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +125°F (+52°C)
- Storage:
  - Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
  - Upper limit ---------- +160°F (+71.0°C) (for period not more than 4 hr/day)

* M148A2B1 uses spiral-wrapped cartridge case.

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**Packing	1 round per fiber container; 2 containers per wooden box
**Packing box:	
Weight	132 lb
Dimensions	45-13/16 x 14-13/16 x 8-25/32 in.
Cube	3.3 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(04) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
Drawing number	9343009 12935040***
DODAC	1315-C511

*** This drawing shows the M490Al assembled with the spiral-wrapped cartridge case.

References:

AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1300-251-34

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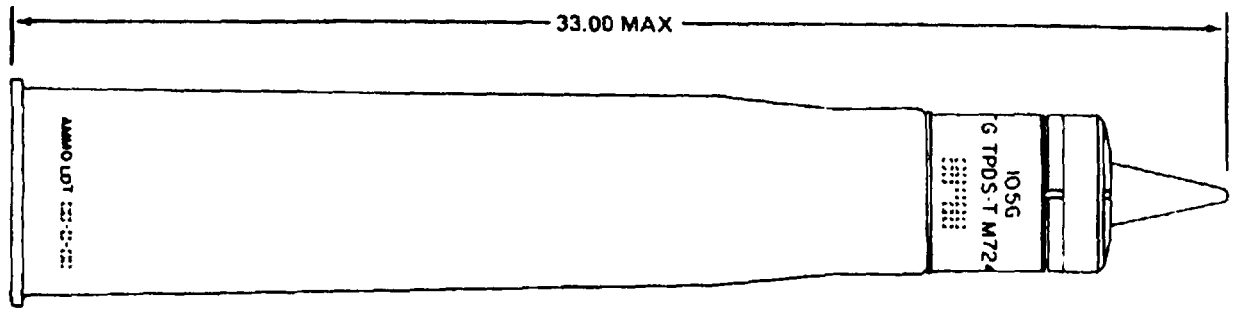
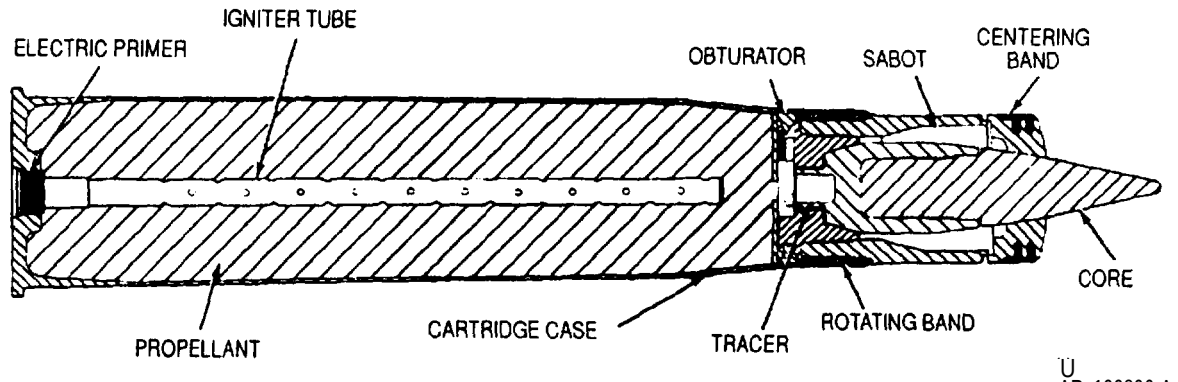
CARTRIDGE, 105 MILLIMETER: TPDS-T, M724A1 AND M724



AR 199807



AR 199806-A

Type Classification:

STD MSR 05746014 dtd 1974.

Use:

This cartridge is used for gunnery training in tank-mounted 105mm gun cannons.

Description:

The discarding sabot round is similar in external appearance and is ballistically similar to 2,000 meters with the APDS-T cartridge M392A2. There is a tracer located in the base of the projectile. A plastic band encircles the sabot at the forward end. A fiber rotating band and rubber obturating band are mounted toward the base of the sabot. The igniter tube of the electric primer extends almost the entire length of the propellant packed loosely in the cartridge case. Some M724A1's may be assembled with the spiral-wrapped cartridge case.

Functioning:

The electrically initiated primer ignites the propelling charge and tracer. Cases produced by the burning propellant propel the projectile from the gun. The tracer burns for a minimum of 2.5 seconds. The sabot is discarded after leaving the muzzle of the weapon as a result of setback , centrifugal, and air pressure forces. The solid core of the projectile continues to the target. Since it is a practice round, the projectile lacks the penetrating capability of a service round.

Difference Between Models:

The M724 cartridge is a United Kingdom manufactured L45A1 round, modified by replacing the U.K. L1A4 conductive-cap primer with the U.S. M80A1 bridge-wire primer. The M724.A1 is a United States manufactured car-

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Tabulated Data:

Complete round:
- Type ---------- TPDS-T
- Weight ---------- 321b
- Length ---------- 33in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white markings

Components:
- Cartridge case ---------- M115B1, M115B1A1*
- Propelling charge ---------- M1
- Primer ---------- M80A1
- Tracer ---------- M13

Performance:
- Maximum range ---------- 16,739 m (18,450 yd)
- Muzzle velocity ---------- 1539 mps (5080 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-400C)
  - Upper limit ---------- +125°F (+520C)
- Storage:
  - Lower limit ---------- -80°F (-62.20°C) (for period not more than 3 days)
  - Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

Packing ---------- **1 round per fiber container; 2 containers per wooden box

**Packing box:
- Weight ---------- 107 lb
- Dimensions ---------- 39-7/8 x 14-1/8 x 8-23/32 in.
- Cube ---------- 2.8cu ft

* M1 15B1A1 uses spiral-wrapped cartridge case.
** NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (04) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT decimation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C520
Drawing number ---------- 9278500 12935041***

*** This drawing shows the M724A1 assembled with the spiral-wrapped cartridge case.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

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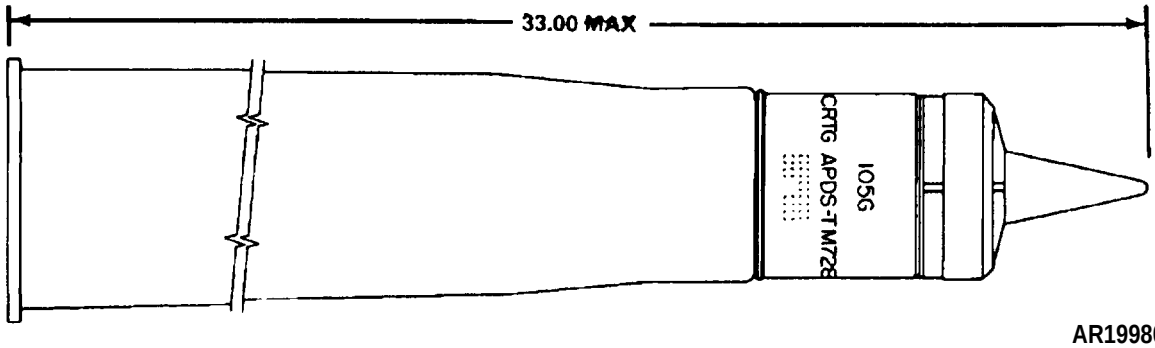
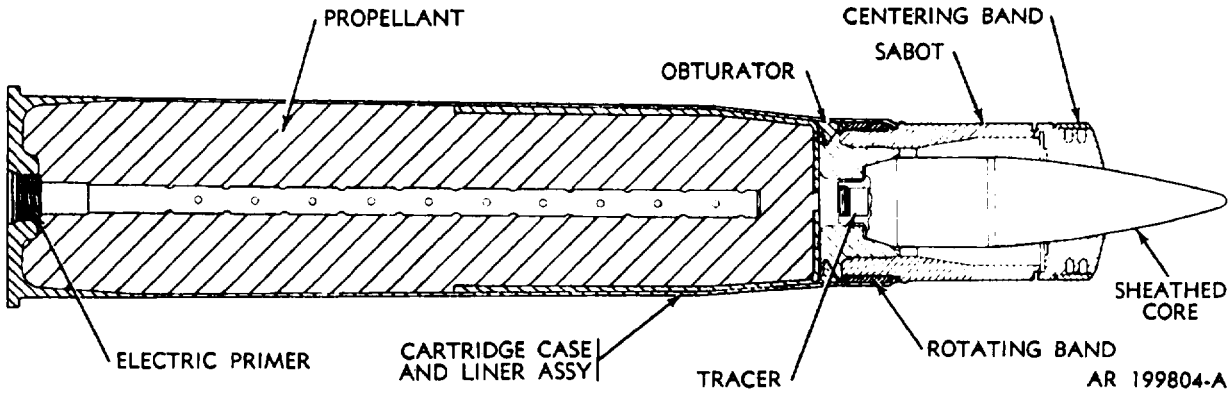
CARTRIDGE, 105-MILLIMETER: APDS-T, M728





Type Classification:

Std MSR 02787001.

Use:

This cartridge is a high velocity, flat trajectory, discarding sabot round used in 105-mm gun cannons against armored targets.

Description:

The projectile consists of a tungsten, nickel, copper penetrator seated in a steel base with tracer and aluminum forward sheath, These components are encased in an aluminum and magnesium sabot. A plastic centering band encircles the sabot at the forward end, fiber rotating band and rubber obturator are mounted toward the base of the sabot. The cartridge case contains a polyurethane laminar additive liner over the forward end of the propellant. The case is loosely packed with propellant, and is fitted with an electric primer.

Functioning:

The primer is electrically initiated to ignite the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds. The sabot discards upon leaving the gun tube by setback, centrifugal, and air pressure forces. The spin stabilized projectile sheathed core penetrates the target solely by kinetic energy.

Tabulated Data:

Complete round:

Type	APDS-T
Weight	41.70 lb
Length	33.0 in.
Cannon used with	M68

Projectile:

Body material	Sabot-magnesium/aluminum penetrator tungsten/nickel/copper

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Projectile: (cont.)
Color ---------- Black w/white-marking
Components:
Cartridge case ---------- M115B1
Propelling charge ---------- M30
Primer ---------- M80A1
Tracer ---------- M13
Performance:
Effective range ---------- 5,000 m
Maximum range ---------- 50,879 m
Muzzle velocity ---------- 4,680 fps

Temperature Limits:

Firing:
Lower limit ---------- -60°F (-53.8°C)
Upper limit ---------- +125°F (+52.0°C)
Storage:
Lower limit ---------- -65°F (-53.8°C)
Upper limit ---------- +145°F (+63°C)
*Packing ---------- 1 round per fiber container; 2 containers per wooden box
*Packing Box:
Weight ---------- 126 lb
Dimensions ---------- 39-7/8 x 14-1/8 x 8-23/32 in.
cub ---------- 2,8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Storage class/SCG ---------- (08) 1.2C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C494
Drawing number ---------- 9276810

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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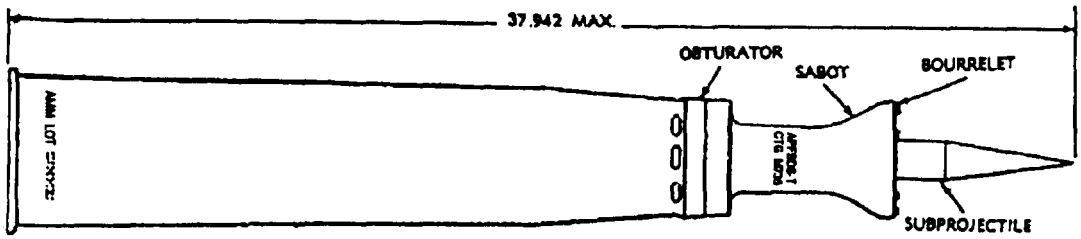
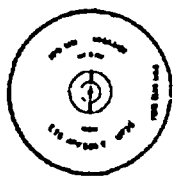
CARTRIDGE, 105-MILLIMETER: APFSDS-T M735





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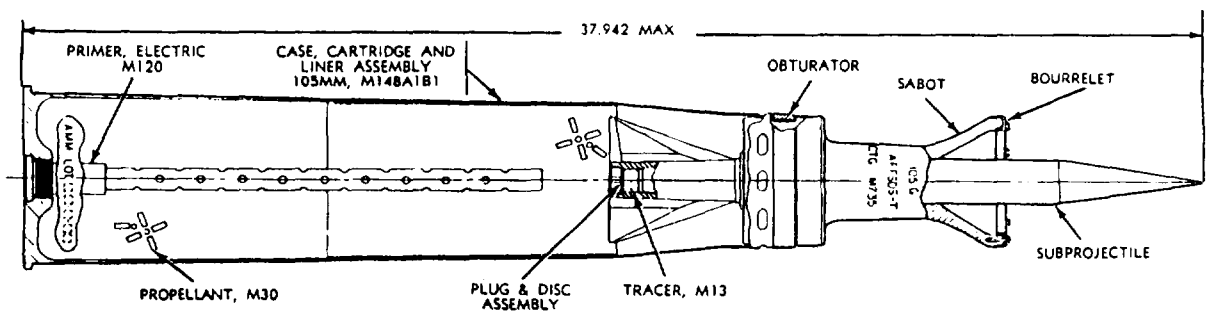
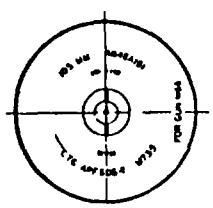
AR 101660-A





AR 100995-C

Type Classification:

Cartridge, 105-mm, APFSDS-T, M735.

Use:

This cartridge is a high velocity, flat trajectory, discarding sabot round used in 105-mm gun cannons against armored targets.

Description:

The projectile consists of a subprojectile and sabot. The sub subprojectile consists of a steel-nickel body, which houses a tungsten core and is fitted with an aluminum windshield and fin assembly. The aluminum sabot, composed of three 120 degree sections, is assembled around the subprojectile. A steel hourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal is assembled around the sabot, and a urethane seal is applied over the rear face of the sabot. An M13 tracer is assembled in the fin and held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 cartridge case, which holds approximately 12.5 lb of M30 propellant, and is fitted with an M120 electric primer. A gun tube wear-reducing titanium-dioxide liner is assembled to the interior wall of the cartridge case.

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Functioning:

The M735 is loaded and fired in the tank gun in the normal manner. Upon firing, the sabot with its subprojectile is propelled from the gun and the tracer is ignited. The subprojectile is in a low friction bearing surface within the sabot and is free to rotate and so does not pick up the high rotation rate the gun rifling normally imparts to a projectile. Upon leaving the gun, centrifugal and aerodynamic forces cause the sabot to separate from the subprojectile and it quickly falls to earth. The fin-stabilized subprojectile continues on a true course to the target at high velocity. Target penetration is effected strictly by the high kinetic energy of subprojectile's high density core when it impacts:

Tabulated Data:

Complete round:

Type	Fixed
Weight	39.50 lb
Length	37.94 in.
Assembly drawing number	9296707
Color	Black w/white markings

Temperature Limits:

Firing:

Lower limit	-25°F (-32°C)
Upper limit	+125°F (+52°C)

Storage:

Lower limit	-65°F (-53.8°C)
Upper limit	+ 160°F (+71.l°C)

Performance:

Chamber pressure	60,000 psi @ +70°F

Packaging:

Inner pack drawing	9293481
Outer pack drawing	9293479
Weight	132.0 lb
Cube	3.4 ft
*Packing	1 round per fiber container; 2 containers per wirebound box
*Packing Box:	
Weight	124.0 lb
Dimensions	47-7/16 x 13-5/16 x 7-1/16 in.
Cube	2.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Storage class/SCG	(08) 1.2 C
DOT shipping class	B
DOT classification	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C521

References:

TM 9-1300-251-20
TM 9-1300-251-34

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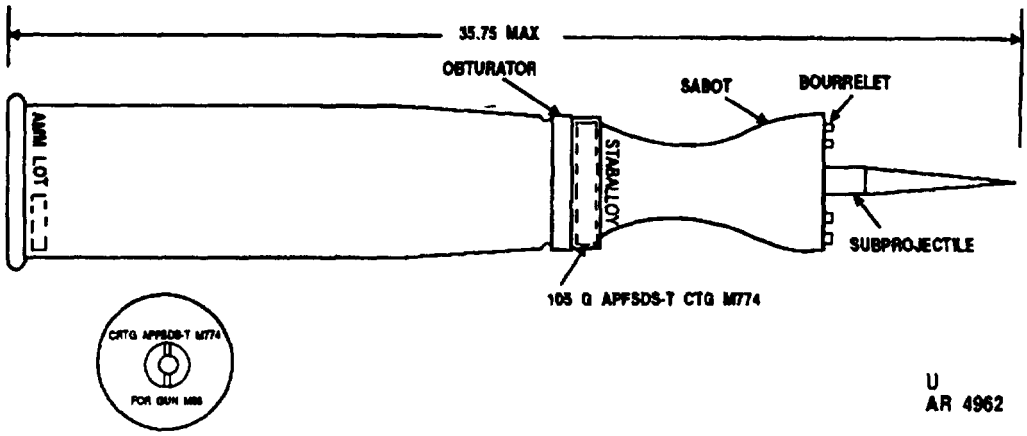
CARTRIDGE, 105-MILL1METER: APFSDS-T, M774



Type Classification:

LCCA Oct 1980.

Use:

This cartridge is an armor-piercing antitank cartridge and is intended for use in 105-mm, M68 gun against armored targets.

Description:

The projectile consists of a subprojectile and sabot. The subprojectile consists of a monolithic staballoy (depleted uranium) core, which is fitted with an aluminum windshield with steel tip to eliminate aerodynamic heating and an aluminum fin assembly. The aluminum sabot, composed of three 120 degree sections, is assembled around the subprojectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 Tracer is assembled to the fin and is held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 13 pounds of M30 propellant, and is fitted with an M120 electric primer. A gun tube wear-reducing titaniun-dioxide liner is assembled to the interior wall of' the cartridge case.

Functioning:

During projectile flight, the tracer burns for a minimum of 2.5 seconds. The sabot discards upon leaving the gun tube by aerodynamic and centrifugal forces. The projectile is fin-stabilized in flight. In order that only minimal spin is imparted to the projectile when the obturator engages the gun tube rifling, the plastic seal under the obturator reduces the coefficient of friction, producing approximately 80 percent slippage. The core penetrates the target solely by kinetic energy.

Tabulated Data:

NOTE

Classified tabulated data has not been included in this manual.

Complete round:

Type	APFSDS-T
Weight	37.8 lb
Length	35.75 in.
Cannon used with	M68

Projectile:

Subprojectile material	Depleted uranium
Sabot	Aluminum
Color	Black w/white markings

Components:

Cartridge case	M148A1B1
Propellant	M30
Primer	M120
Tracer	M13

Temperature Limits:

Firing:

Lower limit	-35°F (-37.2°C)
Upper limit	+125°F (+52.0°C)

Storage:

Lower limit	-70°F (-57.0°C)
Upper limit	+160°F (+71.1°C)

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*Packing ---------- 1 round per fiber container; 2 containers per wooden box
*Packing Box:
Weight ---------- 140 lb
Dimensions ---------- 47-7/16 x 13-5/16 x 7-1/16 in.
Volume ---------- 3.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Storage class/SCG ---------- (08) 1.2C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C523
Drawing number ---------- 9329513

Limitations:

Projectile is not to be disposed of by burning or detonation.

The M774 is a full service round which may only be fired during war emergency. All peace time firings are prohibited except at times of NRC license and host nation agreement.

NOTE

Loss or unauthorized firings of the M774 must be reported to HQ, AMCCOM within 24 hours of the discovery. Telephone reports should be followed with a written report to:
Commander
USA AMCCOM
ATTN: AMSMC-SF
Radiological Protection Officer (RPO)
Rock Island, IL 61229-6000
Autovon: 793-2969/296412965/ 2966
Commercial: (309) 782-2969/2964/ 2965/2966
Non-duty hours, call Staff Duty Oficer:
Autovon: 793-1110
Commercial: (309) 782-1110

All transmissions regarding incidents of this nature must be classified at least CONFIDENTIAL.

The possession of the source material (Depleted Uranium) is licensed to HQ, AMCCOM, in accordance with Federal Law, Title 10, Code of Federal Regulations. The AMCCOM Commander (RPO) is responsible for the license conlpliance and personally accountable for the source material. Violations of this law may result in a personal fine or imprisonment. Failure to report a non-compliance is also punishable under Federal Law.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1300-250
TM 9-2350-253-10
TM 9-2350-255-10-1
TM 9-2350-257-10-3

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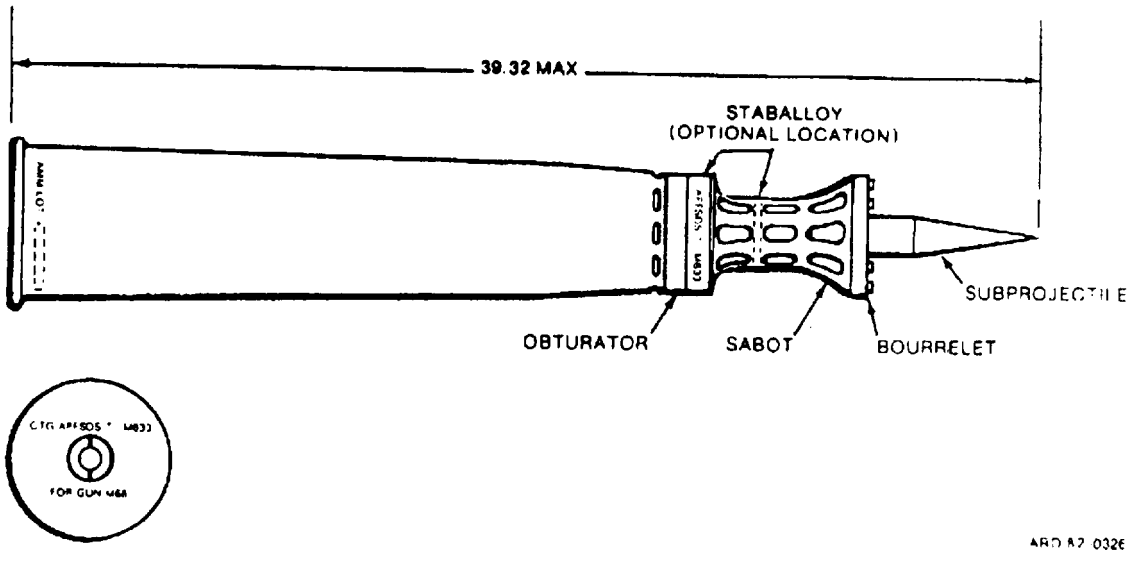
CARTRIDGE, 105-MILLIMETER: APFSDS-T, M833



ARD A2 032E-A

Type Classification:

TC Std 7 Apr 83 by DA Letter.

Use:

This cartridge is an armor-piercing antitank cartridge and is intented for use on 105-mm guns M68 cannon, against armored targets.

Description:

The projectile consists of a subprojectile and sabot. The subprojectile consists of a monolithic staballoy (depleted uranium) core, and is fitted with an aluminum windshield with steel tip to eliminate aerodynamic heating and an aluminum fin assembly. The aluminum sabot is composed of three 120 degree sections, which transfer momentum to the subprojectile through a series of mating buttress grooves. The sabot is an adaptation of the M736/M774 technology differing in design by the use of gussets in the sabot segments to retain strength and rigidity and reduce the weight. A steel hourrelet, containing three shear cuts, is screwed to the sabot forward face. A two piece nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 Tracer is assembled to the fin and is held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 12.8 pounds of M30 propellant, and is fitted with an M120 electric primer. A gun tube wear-reducing titanium-dioxide liner is assembled to the interior wall of the cartridge case.

Functioning

During projectile flight, the tracer burns for a minimum of 2.5 seconds. The sabot discards upon leaving the gun tube by aerodynamic and centrifugal forces. The projectile is fin stabilized in flight. In order that only minimal spin is imparted to the projectile when the obturator engages the gun tube rifling, the plastic seal under the obturator reduces the coefficient of friction, producing approximately 80 percent slippage. The core penetrates the target solely by kinetic energy.

Tabulated Data:

NOTE

Classified tabulated data has not been included in this manual.

Complete round:
- Type ---------- APFSDS-T
- Weight ---------- 38.2 lb (17.3 kg)
- Length ---------- 39.32 in
- Cannon used with ---------- M68

Projectile:
- Sabot ---------- Aluminum

Subprojectile:
- Body material ---------- Depleted uranium
- Color-- ---------- Black w/white markings

Components:
- Cartridge case ---------- M148A1B1
- Propellant ---------- M30
- Primer ---------- M120
- Tracer ---------- M13

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Temperature Limits:

Firing:
- Lower limit ---------- -35°F (-37.2°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -50°F (-46°C)
- Upper limit ---------- +145°F (+62.8°C)

*Packing:
- Alternate ---------- 1 round per fiber container, 2 containers per wooden box
- Standard ---------- 1 round per metal container, 30 containers to a pallet

*Packing Box:
- Weight ---------- 124 lb
- Dimensions ---------- 48-3/4 x 14-1/16 x 8-9/16 in.
- Volume ---------- 3.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Metal Container:

Weight ---------- 0.671b
Dimensions ---------- 45.67 x 7.13 x 7.13 in.
Volume ---------- 0.9 cu ft

Shipping & Storage Data:

UNO serial number ---------- 0328
Storage class/SCG ---------- (08) 1.2
DOT shipping class ---------- B
DOT designation ---------- AMMUNITON FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C524
Drawing number ---------- 9342932

Limitations:

Projectile is not to be disposed of by burning or detonation.

The XM833 is a full service round which may only be fired during war emergency. All peacetime firings are prohibited except at times of NRC license and host nation agreement.

Firing the M833 at ammunition temperatures above +125°F (+52.0°C) may result in excessive chamber pressures. Firing the M833 at ammunition temperatures below -35°F (-37.2°C) may result in weapon damage.

NOTE

Loss or unauthorized firings of the M833 must be reported to HQ, AMCCOM RPO within 24 hours of the discovery. Telephone reports should be followed with a written report to:
Commander
USA AMCCOM
ATTN: AMSMC-SF
Radiological Protection Officer (RPO)
Rock Island, IL 61229-6000
Autovon: 793-2969/2964/2965/2966
Commercial: (309) 782-2969/2964/2965/2966
Non-duty hours, call Staff Duty Officer:
Autovon: 793-1110
Commercial: (309) 782-1110

All transmissions regarding incidents of this nature must be classified at least CONFIDENTIAL. The possession of the source material (Depleted Uranium) is licensed to HQ, AMCCOM, in accordance with Federal Law, Title 10, Code of Federal Regulations. The AMCCOM Commander (Radiological Protection Officer) is responsible for the license compliance and personally accountable for the source material. Violations of this law may result in a personal fine or imprisonment. Failure to report a non-compliance is also punishable under Federal Law.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-250
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-255-10-1
TM 9-2350-257-10-3

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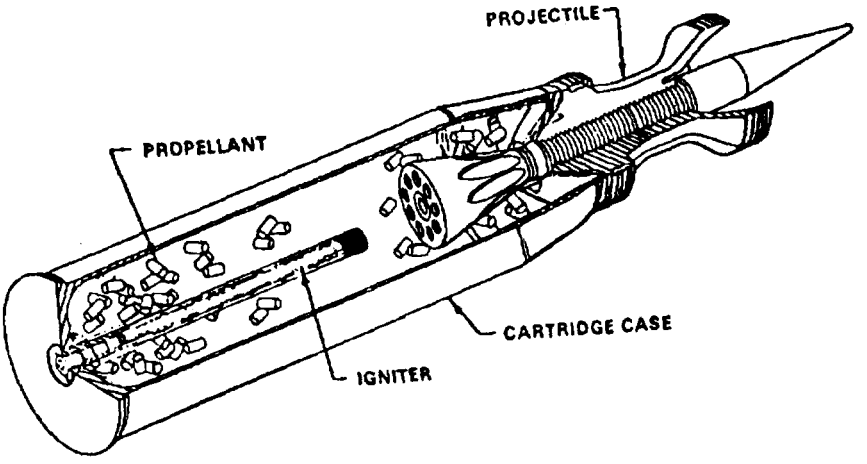
CARTRIDGE, 105-MILLIMETER: TPCSDS-T, DM128 (PATRONE, 105-MILLIMETER, DM128)



ARD 2765

Type-Classification:

STD-15 July 86

Use:

This cartridge is a kinetic energy, target practice round for use in the 105-mm, M68 cannon. It is designed to provide duplication of the service rounds (M735, M774 and M833) characteristics at reduced maximum ranges to allow practice firings on short-range proving grounds and training areas. This cartridge was developed and is produced by West Germany and procured by the United States on a limited basis.

Description:

The projectile consists of a subprojectile and sabot. The subprojectile is made up of a one piece steel core with an aluminum tail cone assembly which is assembled to the sabot by means of threads. The tail cone has nine holes and in conjunction with the cone provides stabilization. The tail cone assembly also contains a tracer. The aluminum sabot is comprised of three 120 degree noninterchangeable segments with internal screw threads which match those on the outer diameter of the subprojectile. The sabot has a silicon rubber seal at the rear to prevent gas leakage. The projectile is crimped to a DM60 brass cartridge case, which holds approximately 13.2 pounds of LV-1900B propellant, and is fitted with a DM82A1 electric primer. A gun tube wear-reducing titanium-dioxide liner is assembled to the interior wall of the cartridge case.

Functioning:

The DM128 is loaded and fired from the 105-mm tank gun in the normal manner. Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propelling charge generating gases which drive the projectile from the gun and ignites the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gases) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue to target while the sabot segments fall quickly to earth. The tail cone segment of the subprojectile, due to the nine hole arrangement, causes aerodynamic slowing of the subprojectile to limit its range to 7500 m.

Tabulated Data:

Complete round:

Type	Fixed, TPCSDS-T
Weight	36.6 lb (16.6 kg)
Length	36.4 in. (923.6 mm)
Cannon used with	M68
Assembly drawing	1300705
Color	Blue w/white markings on projectile

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Temperature Limits:

Firing:
Lower limit ---------- -25°F (-31.6°C)
Upper limit ---------- +125°F (+51.7°C)
Storage:
Lower limit ---------- -35°F (-37.2°C)
Upper limit ---------- +125°F (+51.7°C)

Performance:

Chamber pressure ---------- 64,000 psi @70°F

Packaging:

Inner pack drawing ---------- 8140-48-1050K-85040
Outer pack drawing ---------- 8140-58-1050K-85041
*Packing ---------- 1 round per fiber container; 2 containers per wooden box, 12 boxes per pallet.

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Packing Box:

Weight ---------- 130 lb
Dimensions ---------- 46.94 in. x 14.37 in. x 10.83 in.
Cube ---------- 4.23 cu ft

Skipping and Storage Data:

DOD hazard class (subject to change) ---------- (08) 1.2
Storage compatibility group (subject to change) ---------- C
DOT shipping class (subject to change) ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C533

WARNING

DO NOT FIRE OVER THE HEADS OF FRIENDLY TROOPS, UNLESS TROOPS HAVE ADEQUATE COVER. TROOPS MAY BE STRUCK BY THE DISCARDED SABOT.

CAUTION

EVEN THOUGH THIS IS A TARGET PRACTICE ROUND, THE CORE CAN CAUSE DAMAGE AND PENETRATE LIGHTLY ARMORED VEHICLES.

NOTE

The identification markings found on each cartridge, fiber container, and wooden box are in German. The following is the German marking with the English translation:

GERMAN MARKING

Wooden Box: 1315-12-306-9245-CP43 (C533)
2 PATRONE, UEBUNG, 105MM X 617, DM128 Treibkafiggescho Bnarchbildung -T
[ ] Kg [ ] m3 GEF [ ]
LOS [ ]

Fiber Container: C533
PATRONE, UEBUNG, 105MM X 617 DM128 Treibkafiggescho Bnarchbildung -T
LOS [ ]

Cartridge: 105K LOS [ ]
UEBT
DM128 105k DM128 LOS [ ]

GERMAN

PATRONE, UEBUNG
Treibkafiggescho Bnarchbildung
-T
LOS
GEF

ENGLISH (Meaning)

TARGET PRACTICE ROUND
Sabot Simulation
Tracer
Lot
Loader

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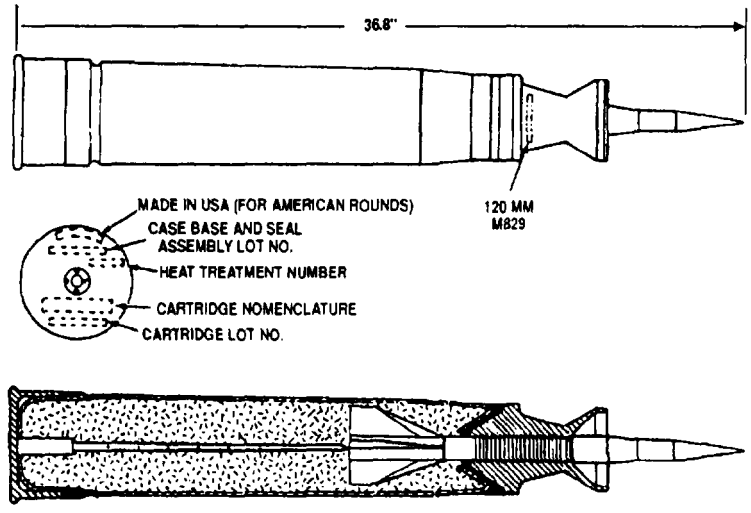
CARTRIDGE, 120-MILLIMETER: APFSDS-T, M829



U
AR 6252

Type Classification:

STD - Dec 84.

Use:

This cartridge is a kinetic energy, armor-piercing antitank round intended for use with the 120-mm smooth bore M256 cannon.

Description:

The M829 is the United States design developed 120-mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of a metal cartridge case base with combustible sidewall, granular propellant within a containment device to prevent spillage, and M125 primer. The projectile consists of the subprojectile and aluminum sabot. The DU penetrator is a one-piece design which is assembled into the sabot by means of grooves. There is a six-bladed aluminum fin with tracer assembly fitted to the rear of the subprojectile and a windshield fitted to the front. The aluminum sabot is composed of four 90 degree non-interchangeable segments with internal grooves matching those on the outer diameter of the subprojectile. The sabot has a silicone rubber seal at the rear to prevent leakage of gas.

Functioning:

The M829 is loaded and fired from the 120-mm tank gun in the normal manner, Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propelling charge and combustible case generating gases which drive the projectile from the gun and ignite the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile down-bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is affected strictly by the high kinetic energy of the subprojectile's high density core when it impacts.

Tabulated Data:

Complete round:

Type	Fixed, APFSDS-T
Weight	41.2 lb
Length	36.8 in.
Assembly drawing	12525600
Color	Black w/white markings

Temperature Limits:

*Firing:	
Lower limit	-50°F (-46°C)
Upper limit	+145°F (+63°C)
*Storage:	
Lower limit	-50°F (-46°C)
Upper limit	+145°F (+63°C)

*NOTE: The M829 maybe fired at these temperatures; however, performance degradation may occur.

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Performance:

Chamber pressure	73.950 psi @70°F 5100 bars @21°C
Velocity (nominal)	5510 ft/sec

Packaging (metal container):

Packing and marking drawing	12630717
Dimensions	44.5 x 7.75 x 7.75 in.
Cube	1.5 cu ft
Weight (w/cartridge)	63.2 lb
Total explosive weight	17.95 lb
** Packing	1 round per metal container; 30 metal containers per pallet.

**NOTE:
* See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.
* M8Z9 ammunition will be stored with other ammunition except SCGG (pyrotechnics and incendiaries).

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
Field storage category	A
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C786
Drawing number	12525600

Limitations:

Projectile is not to be disposed of by burning or detonation.

The M829 is a full service round which may only be fired during war emergency. All peace-time firings are prohibited except on ranges which are NRC (Nuclear Regulator Commission) approved and/or have host nation agreement. The M829 will not be fired over the heads of friendly troops, unless troops are protected by adequate cover. Troops may be struck by the discarded sabot.

NOTE

Loss or unauthorized firings of the M829 must be reported to HQ, AMCCOM RPO within 24 hours of the discovery. Telephone reports should be followed by a written report to:

Commander
AMCCOM
ATTN: AMSMC-SF
Radiological Protection Officer (RPO)
Rock Island, IL 61229-6000
AV 793-2965/2966/2969/2964
Commercial(309)782-2965/2966/2969/2964
Non-duty hours, call Staff Duty Officer: AV 793-1110, Commercial (309) 782-1110

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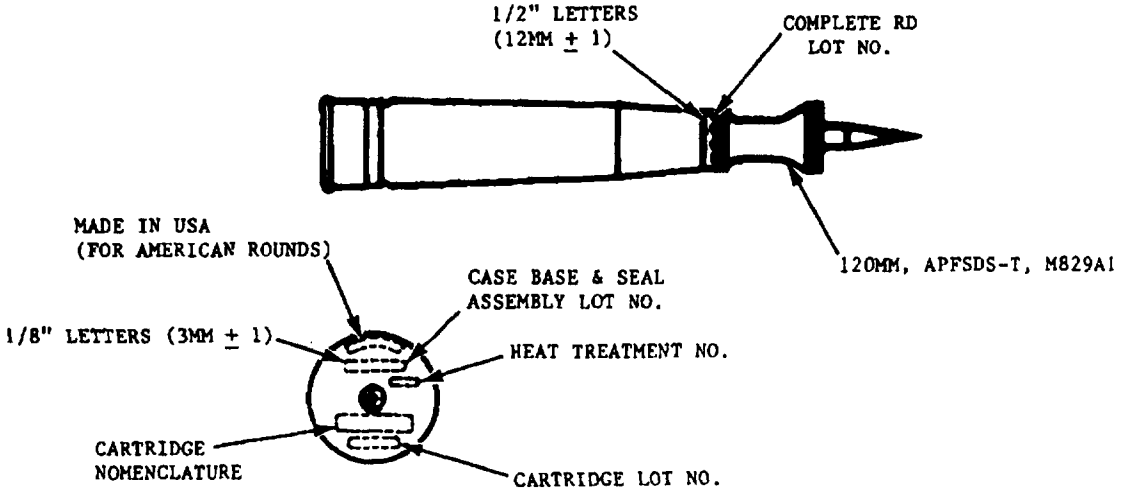
CARTRIDGE, 120-MILLIMETER: APFSDS-T, M829A1



AR 4021

Type Classification:

STD, Classified.

Use:

This cartridge is a kinetic energy, armor piercing antitank round intended for use with the 120-mm smooth bore M256 cannon.

Description:

The M829A1 is a U.S. design developed 120-mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of a metal cartridge case base with combustible sidewall, granular propellant within a containment device to prevent spillage, and M129 primer, while the projectile consists of the subprojectile and aluminum sabot. The depleted uranium penetrator is a one-piece design which is assembled into the sabot by means of buttress grooves. There is a six bladed aluminum fin with tracer assembly fitted to the rear of the subprojectile and a windshield and tip fitted to the front. The aluminum sabot is composed of three 120 degree noninterchangeable segments with internal grooves matching those on the outer surface of the penetrator. The sabot has a silicone rubber seal at the rear to prevent leakage of propellant gases.

Functioning:

The M829A1 is loaded and fired from the M256, 120-mm in the normal manner. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile down-bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

Tabulated Data:

Complete round:

Type	Fixed, APFSDS-T
Weight	46.22 lb (20.97 kg)
Length	38.75 in. (98.43 cm)
Assembly drawing	12527400
Color	Black w/white markings

Temperature Limits:

Firing:	
Lower limit	-25°F (-32°C)
Upper limit	+120°F (+49°C)
Storage:	
Lower limit	-50°F (-46°C)
Upper limit	+145°F (+63°C)

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Performance:

Chamber pressure	96000 psi (661,920 kPa) @ 120°F and 82650 psi @ 70°F
Velocity (nominal)	5150 ft/sec

*Packaging:

Packing and marking drawing	12526435
Weight (w/cartridge)	67.44 lb (30.59 kg)
Total explosive weight	17.5 lb
Dimensions	44.5 x 7.75 x 7.75 in.
Cube	1.55 cu ft (0.04 cu m)
*Packing	1 round per light weight metal container; 30 containers per pallet

*NOTE: See DOD Consolidated Ammunition Catalog for complete packaging data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class:	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C380

Limitations:

Projectiles are not to be disposed of by burning or detonation.

The M829A1 is a full-service round which may only be fired during war emergency. All peace-time firings are prohibited except at locations having a Nuclear Regulatory (NRC) license and host nation agreement.

WARNING

THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER AND SHALL BE RETURNED IN A SEALED CONTAINER TO THE APPROPRIATE ASP FOR DISPOSITION.

NOTE

Loss or unauthorized firing of the M829A1 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery Telephone reports should be followed by a written report to:

Commander,
AMCCOM
ATTN: AMSMC-SF
Radiological Protection Officer (RPO)
Rock Island, IL 61229-6000
AV 793-2965/2966/2969/2964
Commercial (309) 782-2965/2966/2969/2964
Non-duty hours, call Staff Duty Officer: AV 793-1110
Commercial (309) 782-1110

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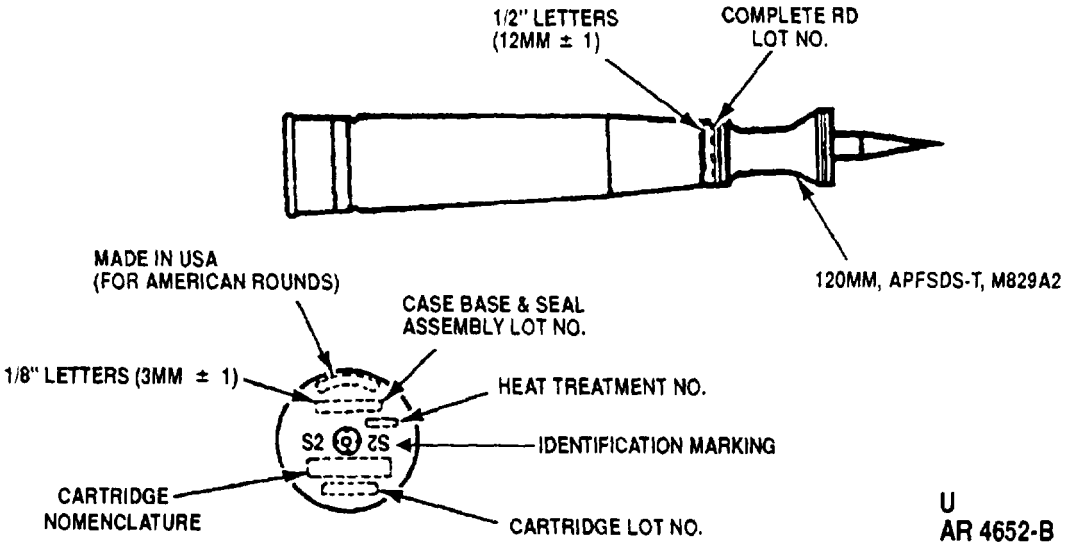
CARTRIDGE, 120 MILLIMETER: APFSDS-T, M829A2



Type Classification:

STD - 29 Sep 92.

Use:

The M829A2 cartridge is a kinetic energy, armor-piercing, fin-stabilized, discarding sabot, fixed round with tracer (APFSDS-T). This anti-tank round is intended for use in the M256 smooth bore gun and is designed to provide terminal effectiveness over the M829A1 cartridge.

Description:

The M829A2 is a U.S. design developed 120mm APFSDS-T cartridge. The complete round contains a propulsion/ignition system and an inert projectile which is similar to the M829A1. The propulsion/ignition system consists of a combustible cartridge case with a metal cartridge case base, granular and stick propellant, and an M129 electric primer. The subprojectile assembly consists of a depleted uranium penetrator, with windshield and windshield tip fitted to the front, and a six-bladed aluminum fin and tracer assembly fitted to the rear. The projectile consists of the subprojectile combined with a sabot, an obturator and a silicone seal. The sabot is composed of three 120 degree noninterchangeable segments with internal grooves matching those on the outer surface of the penetrator. The sabot has a silicone rubber seal at the rear to prevent leakage of propellant gases. A nylon obturator is used to prevent propellant gases from leaking around the outside of the sabot.

Functioning:

The M829A2 is loaded and fired from the M256, 120mm in the normal manner. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true

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course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

Tabulated Data:

M829A2 Cartridge.

Complete round:	
Type	Fixed, APFSDS-T
Weight	4.88 lb (20.36 kg)
Length	38.74 in. (984 mm)
Assembly drawing	12944255
	Black w/white markings
Temperature limits:	
Firing:	
Lower limit	-25°F (-32°C)
Upper limit	+120°F (+49°C)
Storage:	
Lower limit	-45°F (-43°C)
Upper limit	+145°F (+63°C)
Performance:	
Chamber pressure	84000 psi @ 70°F 5800 bars @ 21°C
Velocity (normal)	5512 ft/sec (-1680 m/sec)
Packaging (metal container):	
Packing and marking drawing	12944283
Dimensions	7.75 x 7.75 x 44.5 in.
Cube	1.55 cu ft
Total weight (w/ cartridge)	66.1 lb (29.98 kg)
Total explosive weight	16-20 lb (7-9 kg)
*Packing	One round per metal container; 30 metal containers per pallet

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
DOD hazard class	(08) 1.2
Storage compatibility group	C
Field storage category	A
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	TBD

Limitations:

Projectiles are not to be disposed of by burning or detonation.

The M829A2 is a full-service round which may only be fired during war emergency. All peace-time firings are prohibited except at locations having a Nuclear Regulatory (NRC) license and host nation agreement.

WARNING

IF THE CARTRIDGE IS DAMAGED TO THE POINT WHERE THE INTERNAL PROJECTILE COMPONENTS ARE VISIBLE, THE ITEM SHALL BE TREATED AS CONFIDENTIAL, THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER OR OTHERWISE COVERED TO PREVENT EXPOSURE. THE CARTRIDGE SHALL BE RETURNED IN A SEALED CONTAINER (AS A CLASSIFIED ITEM) TO THE APPROPRIATE ASP FOR DISPOSITION. SHOULD IT BE DETERMINED THAT THE CLASSIFIED COMPONENTS WERE OBSERVED BY ANYONE WITHOUT A CLEARANCE, THE INDIVIDUAL(S) MUST BE DEBRIEFED AS SOON AS POSSIBLE.

NOTE

Loss or unauthorized firing of the M829A2 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery. Report to:

Commander, AMCCOM, ATTN: AMSMC-SF, Radiological Protection officer (RPO), Rock Island, IL 61299-6000, DSN 793-2964/2965/2966, Commercial (309) 782-2964/2965/2966. During non-duty hours call staff duty officer: DSN 793-1110, Commercial (309) 782-1110.

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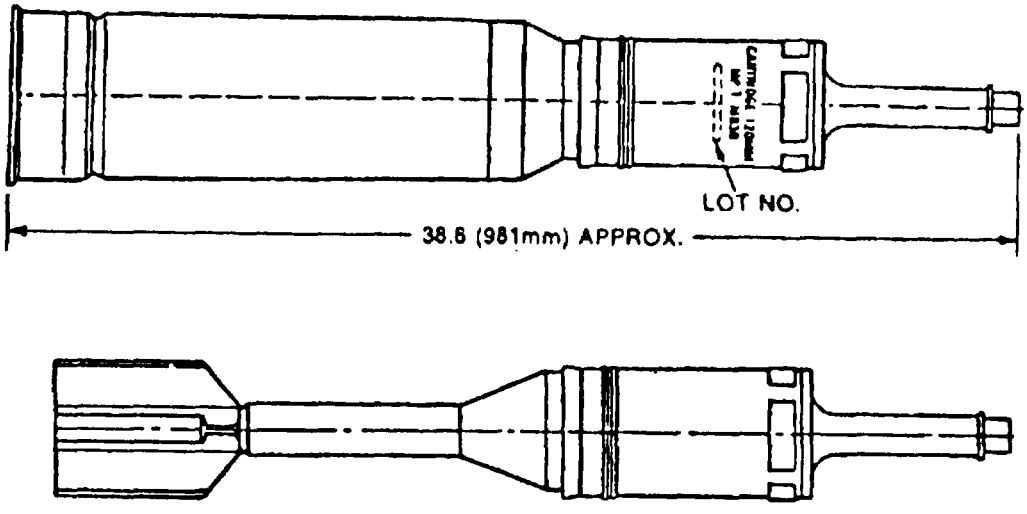
CARTRIDGE, 120-MILLIMETER: HEAT-MP-T, M830



ARD 83-0667-A

Type Classification:

December 1984.

Use:

This cartridge is a high explosive multipurpose cartridge which has antiarmor and antipersonnel capabilities. The cartridge is fired from the 120-mm smooth bore M256 cannon.

Description:

The M830 HEAT-MP-T, 120-mm cartridge is a direct translation of the German DM12A1 round with the exception that a United States design fuze system and explosive (Composition A3, Type 11) is used.

The 120-mm HEAT-MP-T M830 is a high explosive round having both antiarmor and antipersonnel capabilities. The round consists of a steel body loaded with explosives surrounding a copper shaped charge liner and wave shaper. The projectile embodies a steel spike with a shoulder and nose switching mechanism for full frontal area functioning and graze impact which initiates a base detonating fuze. The fuze is located at the rear of the projectile body. The projectile body has a copper obturator, boom and fin assembly for flight stabilization. The fin contains a tracer for projectile to target visual tracking.

The propellant system utilizes a metal cartridge case base with a rubber obturator at the stub case mouth, M123A1 Primer, and a combustible wall which encapsulates stick propellant within six containment devices to prevent spillage should breakage or separation occur.

The weight of the complete cartridge is approximately 53.4 pounds (24.2 kg) with the approximate weight of the projectile being 30 pounds (13.1 kg).

Functioning:

The M830 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. When the electric primer in the breech of the weapon is initiated, the resulting flash ignites the propelling charge and combustible case. This generates gases which drive the projectile from the gun and ignite the tracer element. Upon impact, one of the fuze sensors is initiated. The fuze then detonates the high explosive-shaped charge which collapses the cone assembly creating a high velocity focused shock wave and a jet of metal particles that penetrate the target. Antipersonnel capability results from fragmentation of the projectile body sidewall.

Tabulated Data:

Complete round:

Type	Fixed, High Explosive Antitank Multipurpose w/Tracer
Weight	53.4 lb (24.2 kg)
Length	38.6 in. (981 cm)
Assembly drawing	12526622
Color	Black w/yellow markings

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Temperature Limits:

Firing:
Lower limit ---------- -50°F (-46.0°C)
Upper limit ---------- +145°F (+63.0°C)
Storage:
Lower limit ---------- -50°F (-46.0°C)
Upper limit ---------- +145°F (+63.0°C)

Performance:

Chamber pressure (peak) ------ @69,600 psi
Velocity (nominal) ---------- 3740 ft/sec

Packaging:

Inner pack drawing ---------- 12561229-1
Outer pack drawing ---------- 9386833
Weight ---------- 23 lb
Cube ---------- 1.5 cu ft

*Packing ---------- 1 round per metal container, 30 metal containers per pallet

Packing, Metal Container:

Weight ----------
Dimensions ---------- 44.5 in. x 7.75 in. x 7.75 in.
Cube ---------- 1.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
DOD hazard class ---------- (08) 1.2
Storage compatibility group -- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C787

Limitations:

The M830 will not be fired over the heads of friendly troops, unless troops have adequate protection. M830 may prematurely detonate downrange.

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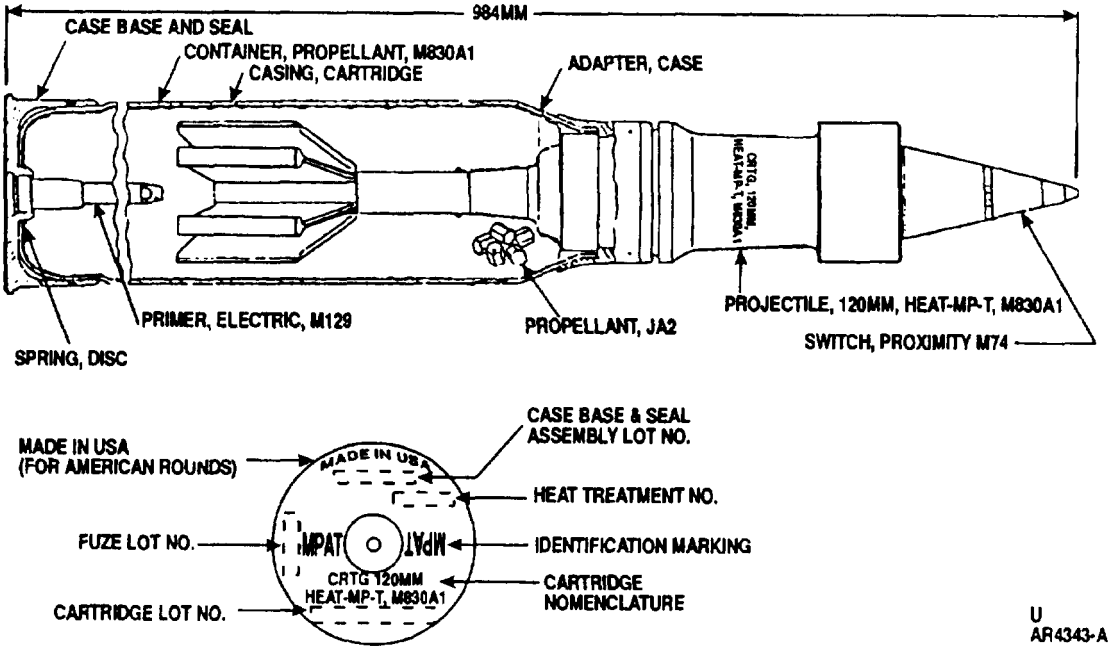
CARTRIDGE, 120-MILLIMETER: HEAT-MP-T, M830A1



Type Classification:

STD -29 Sep 92.

Used:

This cartridge is a high explosive antitank and air defense multipurpose, tactical service round with tracer. The M830A1 is used in the 120-mm smooth bore M256 cannon.

Description:

The cartridge; 120-mm, HEAT-MP-T, M830A1 is a high explosive antitank, multipurpose, tactical service round with tracer. The M830A1 is used in the 120-mm, M256 smooth bore tank cannon and is a fin-stabilized round with a discarding sabot. The baseline design contains a propulsion system consisting of a metal case base, a combustible cartridge case, case adapter, nineteen perforated hexagonal JA-2 propellant, a propellant containment device (cloth bag), and an M129 primer (all are currently used on the M829A1). The projectile consists of a subcaliber projectile and three piece aluminum sabot. The subcaliber projectile combines a fuzing system and a chemical energy warhead (Composition A3 Type II). The three segment sabot is secured to the warhead body by a nylon obturator and a steel retaining ring. The fuzing system includes: M774 base element, flexible communication circuit, Frontal Impact Switch Assembly (FISA) and M74 Proximity Switch. The conical nose of the projectile consists of the FISA coupled to the warhead body and the M74 Proximity Switch coupled to the FISA. The FISA is a secondary switch which closes upon impact against ground target. The M74 Proximity Switch (primary switch) contains two parallel “switches,” either of which, when closed, will complete the M774 firing circuit. One switch closes upon direct impact with a target. The other is an electronic switch (a transistor) which “closes” when the proximity switch senses the presence of an air target. For all modes, a flexible electrical cable provides a path between the switches and M774 base element. In any of the functioning modes of the M830Al fuzing system, the J1 connector of the M774 fuze is returned to "ground potential" which completes the fuze firing circuit.

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The M774 base element is a dual environment safe and arm (S&A) device. The M774 receives an electric firing pulse from either the FISA or the proximity switch which then triggers the base element electronics to fire the M69 electric detonator. The M69 detonator is contained in the rotor which provides a physical separation of the M69 detonator from the fuze electronics until the subprojectile has traveled a safe distance downrange. The first safety feature of the mechanical S&A lock consists of three leafs and a spring, oriented so as to release the rotor upon forward acceleration. The second safety feature is a drag weight which senses the decelerating force/drag of the projectile as it leaves the muzzle. As the drag weight senses drag, it moves out of the way of the rotor allowing the rotor to rotate to the armed position as designed.

Once the M774 base element is armed and receives an electrical firing pulse to trigger the detonator, the detonator, lead, booster, and warhead explosives initiate in sequence destroying the target. The explosive train located in front of the base element consists of the lead cup, booster, and Comp A3 explosive. The warhead explosive is contained in the body with a shaped copper liner, in front of the booster, The liner provides the penetration capability for the system.

An aluminum fin assembly with tracer is attached to the aft end of the subprojectile by way of an aluminum fin adapter. The fin has beveled leading edges and T-tabs on the outside diameter to increase the effective fin area. Spin, which is induced by a twist in the fin blade, provides the subcaliber projectile with greater in-flight stability and accuracy.

Functioning:

The operational characteristics of the M830A1 test cartridges is basically the same as that which is utilized for all HEAT-T tank ammunition. After setting the proximity sensor to the designated target and cambering the cartridge, a voltage is applied to the primer. As current flows through the primer, the igniter charge is initiated which, in turn, initiates the benite strands. The burning benite, which is evenly distributed within the primer body initiates the propellant charge. The expanding gases generated by the burning propellant expel the projectile into the gun barrel leaving only the metal case base and primer body behind. During the propellant burn, the tracer element in the fin assembly is ignited which provides the projectile with tracking visibility. The silicone rubber seal and obturator band at the base of the projectile prevent blow-by of propellant gas during travel in the barrel. The obturating band and retaining ring also function to maintain projectile inbore centering and integrity.

Upon muzzle exit, the air resistance against the front of the sabot breaks the retaining ring and when the obturating hand around the sabot breaks, the sabot falls away in three pieces leaving only the subprojectile to travel to the target. The fin assembly with six equally spaced fins, imparts spin to the subprojectile, thereby stabilizing its flight aerodynamics.

The acceleration of the projectile in the gun tube allows the release mechanism to release the rotor from the first safe position. As the projectile travels downbore, the acceleration forces decrease until the rotor can overcome the forces and start its rotation to the armed position. The inbore acceleration of the fuze allows the setback voltage generator to charge up the firing capacitor. As the projectile leaves the gun muzzle, the drag weight senses the increased drag forces and moves out of the rotor's way, allowing it to arm.

Upon direct impact with a target or when the proximity switch senses the presence of an air target, a firing signal is sent to the M774 base element. The base element's firing capacitor provides the necessary current to initiate the M69 detonator, which initiates the lead, booster, and warhead explosives in sequence. A copper jet is formed by the detonation of the warhead. This copper jet provides the capacity to defeat the ground target.

Tabulated Data:

Complete round:

Type	Fixed, High Explosive Antitank Antihelicopter multipurpose w/ tracer
Weight	50.1 lb (22.7 kg)
Length	38.74 in. (984 mm)
Assembly drawing	12912208

Temperature Limits:

Firing:

Lower limit	-25°F (-32°C)
Upper limit	+125°F (+52°C)

Storage:

Lower limit	-50°F (-46.0°C)
Upper limit	+145°F (+63.0°C)

Performance:

Chamber pressure (peak)	(66620 psi @ 49°C; 6700 bars @ 125°F
Velocity (nominal)	4626 ft/sec (1410 m/sec

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Packing (Metal Container):

Packing and marking drawing	12912370
Dimensions	44.5 in. x 7.75 in. x 7.75 in.
Cube	1.5 cu ft
Total weight (with cartridge)	72.1 lb
Total explosive weight	18.69 lb
*Packing	1 round per metal container, 30 metal containers per pallet

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
DOD hazard class	(08)1.2
Storage compatibility group	E
Field storage category	A
DOT shipping class	A
DOT Designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C791

Limitations:

The M830A1 is a full-service round which may only be fired during war emergency.

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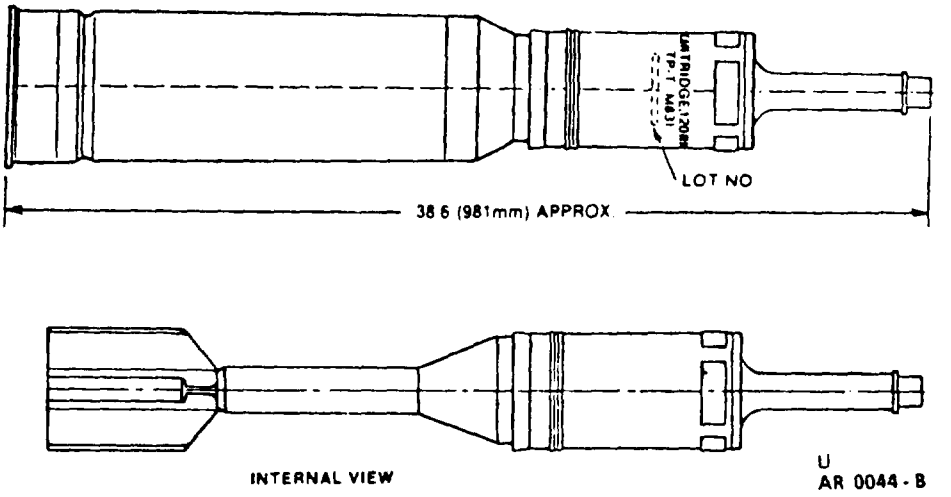
CARTRIDGE, 120-MILLIMETER: TP-T, M831



Type Classification:

STD - Dec 84.

Use:

This cartridge is a target practice round to simulate the ballistics of the M830 High Explosive Antitank Multipurpose with Tracer ammunition. The cartridge is fired from the 120-mm smooth bore M256 cannon.

Description:

The M831 cartridge external appearance is identical to that of the M830 HEAT-MP-T service round. Internally the round does not contain any explosives, shaped charge liner base fuze or nose cap. The round consists of a steel body with aluminum spike and plastic obturator, in addition to a fin and boom assembly with tracer. The complete round propellant system comprises a stub metal case with combustible sidewall and M123 primer. The propellant is a single perforated stick propellant both bagged and unbagged with additional segments fitted over each fin.

Functioning:

The M831 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. When the electric primer in the breech of the weapon is initiated, the resulting flash ignites the propelling charge and combustible case. This generates gases which drive the projectile from the gun and ignites the tracer element. The flight characteristics simulate those of the service round, but does not result in an explosion or penetration upon target impact.

Tabulated Data:

Complete round:

Type	Fixed, target practice
Weight	53.4 lb (24.2 kg)
Length	38.6 in. (981 mm)
Assembly drawing	12527100
Color	Blue w/white markings

Temperature Limits:

Firing:	
Lower limit	-50°F (-46.0°C)
Upper limit	+145°F (+63.0°C)
Storage:	
Lower limit	-50°F (-46.0°C)
Upper limit	+145°F (+63.0°C)

Performance:

Chamber pressure (peak)	73,950 psi @ 70°F
Velocity (nominal)	3740 ft/sec

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Packaging:

Inner pack drawing ---------- 12527220
Outer pack drawing ---------- 12527240
Weight:---------- 36 lb
Cube ---------- 2.4 cu ft
*Packing ---------- 1 round per fiber container; 1 container per wooden box; 20 boxes per pallet
*Packing box:
Weight ---------- 89 lb
Dimensions ---------- 45.6 in. x 9.02 in. x 10.24 in.
Cube ---------- 2.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
DOD hazard class ---------- (08) 1.2
Storage compatibility group -- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC ---------- 1315-C784

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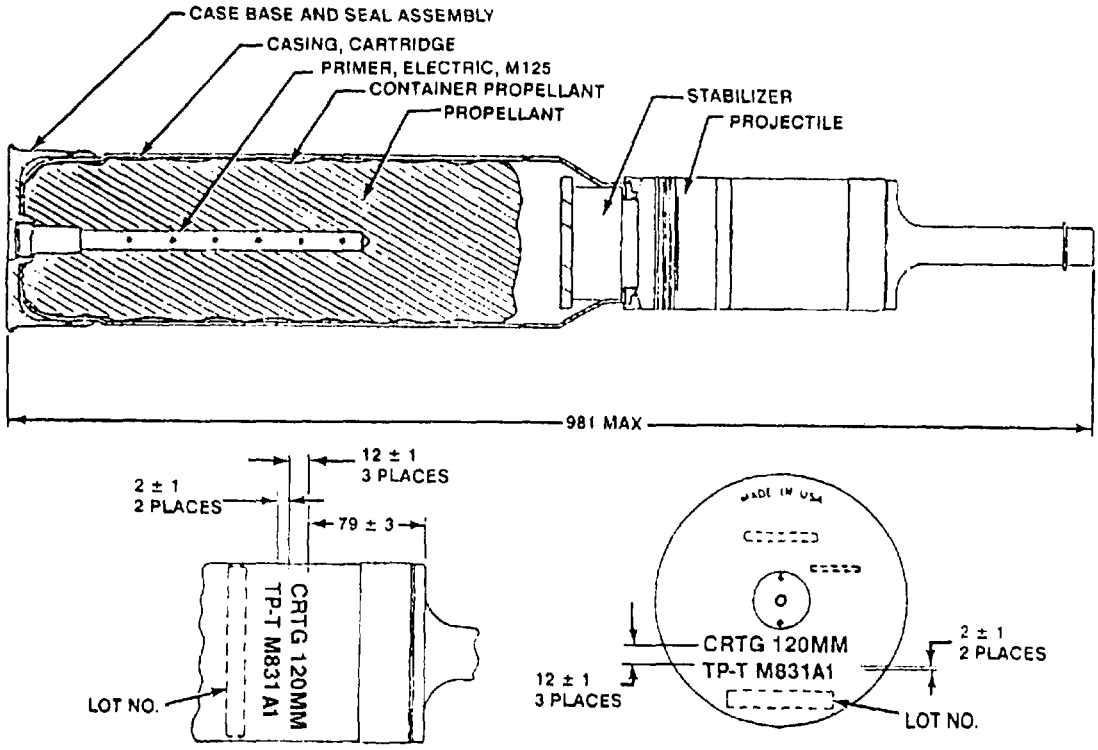
CARTRIDGE, 120-MILLIMETER: TP-T, M831A1



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AR 4709-A

Type Classification:

STD - April 23, 1993.

Use:

The M831A1 cartridge is a fixed 120-mm target practice round with tracer (TP-T) which simulates the ballistics of the High Explosive Antitank Multipurpose with tracer (HEAT-MP-T) M830 cartridge. The M831A1 cartridge with inert projectile is intended for use in the 120-mm smooth bore M256 cannon.

Description:

The external appearance of the M831A1 cartridge is similar to the M831 training round as well as the M830 service round. The M831A1 round consists of an inert projectile composed of a steel spike, aluminum body, ring, stabilizer and nylon obturating band. The fin and boom on the present M831 have been replaced by a stabilizer with six equally spaced slots which impart spin to the M831A1 projectile. The combustible cartridge case, combustible case cap, case base and seal assembly are the same components used on the presently fielded M830 and M831 cartridges. The internal propulsion system for the M831A1 consists of M125 primer, M14 propellant, and tracer.

Functioning:

The M831A1 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone rubber seal and nylon obturating band as well as the case base and seal assembly prevent gas leakage during the projectile travel in the barrel. The obturating band and bourrelet also function to maintain projectile inbore centering and integrity. The stabilizer provides spin for flight aerodynamics. The flight characteristics simulate those of the service round, but do not result in an explosion or penetration upon target impact.

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Tabulated Data:

Complete round:
- Type ---------- Fixed, TP-T
- Weight ---------- 50.5 1b (22.9 kg)
- Length ---------- 38.62 in. (981mm)
- Assembly drawing ---------- 12944397

Temperature Limits:

Firing:
- Lower limit ---------- -25°F (-32°C)
- Upper limit ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -50°F (-46.0°C)
- Upper limit ---------- +145°F (+63.0°C)

Performance:

Chamber pressure ---------- 55,000 psi @ 70°F 73,000 psi @ 145°F

Velocity (nominal) ---------- l140 m/sec (3740 ft/sec)

Packaging:

Packing and marking drawing (metal container) -- 12521674

Dimensions ---------- 44.5 x 7.75 x 7.75 in.

Cube ---------- 1.5 cu ft

Total weight (with cartridge) - 73 lb

Total explosive weight ---------- 15.5 lb

*Packing ---------- 1 round per metal container; 30 metal containers per pallet

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOD hazard class ---------- 1.3

Storage compatibility group -- C

Field storage category ---------- A

DOT shipping class ---------- B

DOT designation ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILE

UNO serial number ---------- 0417

DODAC ---------- 1315-C784

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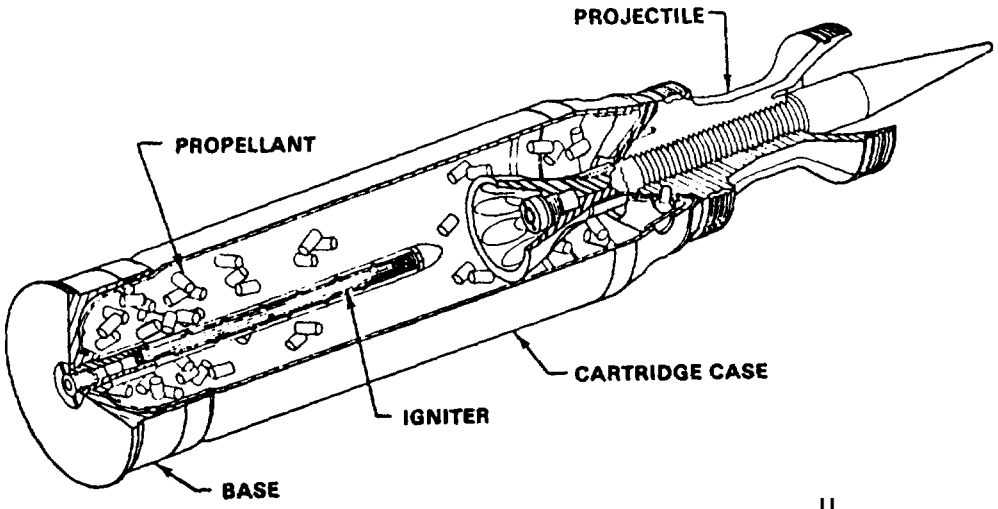
CARTRIDGE, 120-MILLIMETER: TPCSDS-T, M865



Type Classification:

STD June 84.

Use:

This cartridge is a kinetic energy, target practice round for use with the 120-mm smooth bore M256 cannon. It is designed to simulate the service round characteristics at reduced maximum ranges to allow practice firings on short range proving grounds and training areas.

Description:

The cartridge, 120-mm: TPCSDS-T, M865 contains a propulsion system consisting of a stub metal case with combustible sidewall, granular propellant, and electric M125 primer, while the projectile consists of subprojectile and aluminum sabot. The core is a one-piece steel design with a tail cone assembly which is assembled into the sabot by means of threads. The tail cone contains nine holes, or six slots, which in conjunction with the conical shape provide stabilization. Reduced range is achieved by the aerodynamic blocking effect of the holes, or slots. The tail cone assembly also contains a tracer. The aluminum sabot is composed of three 120° noninterchangeable segments with internal screw threads matching those on the outer diameter of the subprojectile. The sabot has a silicone rubber seal at the rear to prevent gas leakage.

The weight of the complete cartridge is approximately 19.0 kg (41.9 lb) and the weight of the subprojectile is approximately 3.2 kg (7.1 lb).

Functioning:

The M865 is loaded and fired from the 120-mm tank gun in the normal manner. Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propelling charge and combustible case generating gases which drive the projectile from the gun and ignites the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gases) propelling the subprojectile down bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue to target, while the sabot segments fall quickly to earth. The tail cone segment of the subprojectile, due to the nine hole (old design) or six slot arrangement, causes aerodynamic slowing of the subprojectile to limit its range to 8000 meters.

Tabulated Data:

Complete round:

Type	Fixed, TPCSDS-T
Weight	41.9 lb (19.0 kg)
Length	34.7 in. max

Assembly drawing:

Standard Sabot (old)	12525000
l-Inch shorter sabot	12525000
New Alliant F^3 design	28251796
New Olin F^3 design	700062
Color	Blue w/white markings

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Temperature Limits:

Firing:
- Lower limit ---------- -50°F (-46.0°C)
- Upper limit ---------- +145°F (+63.0°C)

Storage:
- Lower limit ---------- -50°F (-46.0°C)
- Upper limit ---------- +145°F (+63.0°C)

Performance; Breech Pressure @ 21°C*

Standard sabot (with LKL propellant)	4800 bars
Short sabot (with LKL propellant)	4600 bars
Alliant (short sabot, with LKL propellant)	4600 bars
Olin (short sabot, with M14 propellant)	4950 bars

"NOTE: Expected average breech pressure values at 8.9 cm from rear face of tube.

Packaging (Wooden Box):

Inner pack drawing	12527220
Outer pack drawing	12527240
Dimensions	45.6 in. x 9.02 in. x 10.24 in.
Weight (with cartridge)	77.9 lb
Cube	2.4 cu ft
Explosive weight (Propellant)	19.03 lb
**Packing	1 round per fiber container; 1 container per wooden box, 20 boxes per pallet.

Packaging (Metal Container):

Packing and Marking:

Standard sabot	12561273
Short Cabot	12912175
Alliant F^3 design	12913175
Olin F^3 design	12913175
Dimensions	44.5 in. x 7.75 in. x 7.75 in.
Cube	1.55 cu ft
Total weight (with cartridge)	63.2 lb
Total explosive weight	19.03 lb (LKL propellant) 16.28 lb (M14 propellant)
**Packing	1 round per metal container, 30 metal containers per pallet

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
DOD hazard class	1.3 (Wood Box) (08) 1.2 (Metal Can)
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	13315-C785

WARNING

DO NOT FIRE OVER THE HEADS OF FRIENDLY TROOPS, UNLESS TROOPS HAVE ADEQUATE COVER. TROOPS MAY BE STRUCK BY THE DISCARDED SABOT.

CAUTION

EVEN THOUGH THIS IS A TARGET PRACTICE ROUND. THE CORE CAN CAUSE DAMAGE AND PENETRATE ARMORED VEHICLES.

Differences Between NSN's:

1315-01-165-6488

9 hole cone

Standard sabot

Marking located on sabot midsection (3 lines of 12-mm letters)

Sabot with nylon holding ring on bourrelet (see Fig. 2)

Wood box/fiber container

1315-01-242-4796

9 hole cone

Standard sabot

Marking located on sabot midsection (3 lines of 12-mm letters)

Sabot with nylon holding ring on bourrelete.

Metal Container (PA116)

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Differences Between NSN's: (cont.)

1315-01-288-5545*

6 hole cone

l-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

Sabot without nylon holding ring bourrelet

Metal container (PA116)

Markings: Typical markings for the projectile are shown in figure 1. A difference in location and size (fig. 2) will distinguish the M865 with the slotted cone and reduced sabot size, NSN 1315-01-288-5545 from the 9 hole cone and standard length sabot as follows:

1315-01-288-5545*

6 slot cone (Alliant)

l-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

The case cover is glued to the rear of the sabot as opposed to being attached by screws. Eliminated the inner ring and access holes in case cover.

Metal container (PA116)

1315-01-288-5545*

6 slot cone (Olin)

l-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

The propulsion system uses M14 propellant rather than LKL propellant used in the current M865. Eliminated the inner ring, subprojectile break groove and access holes in case cover.

Metal container (PA116)

*NOTE: Cartridges of this NSN must be replaced in metal containers of the same lot number due to the shortened sabot requiring a different internal container support.

a. Marking for 9 hole cone/standard sabot: l/2-inch letters (12-mm ± 1) in 3 lines on sabot midsection.

b. Marking for 6 cone/reduced length sabot: l/4-inch letters (6-mm ± 1) in 2 lines on sabot midsection or bourrelet.

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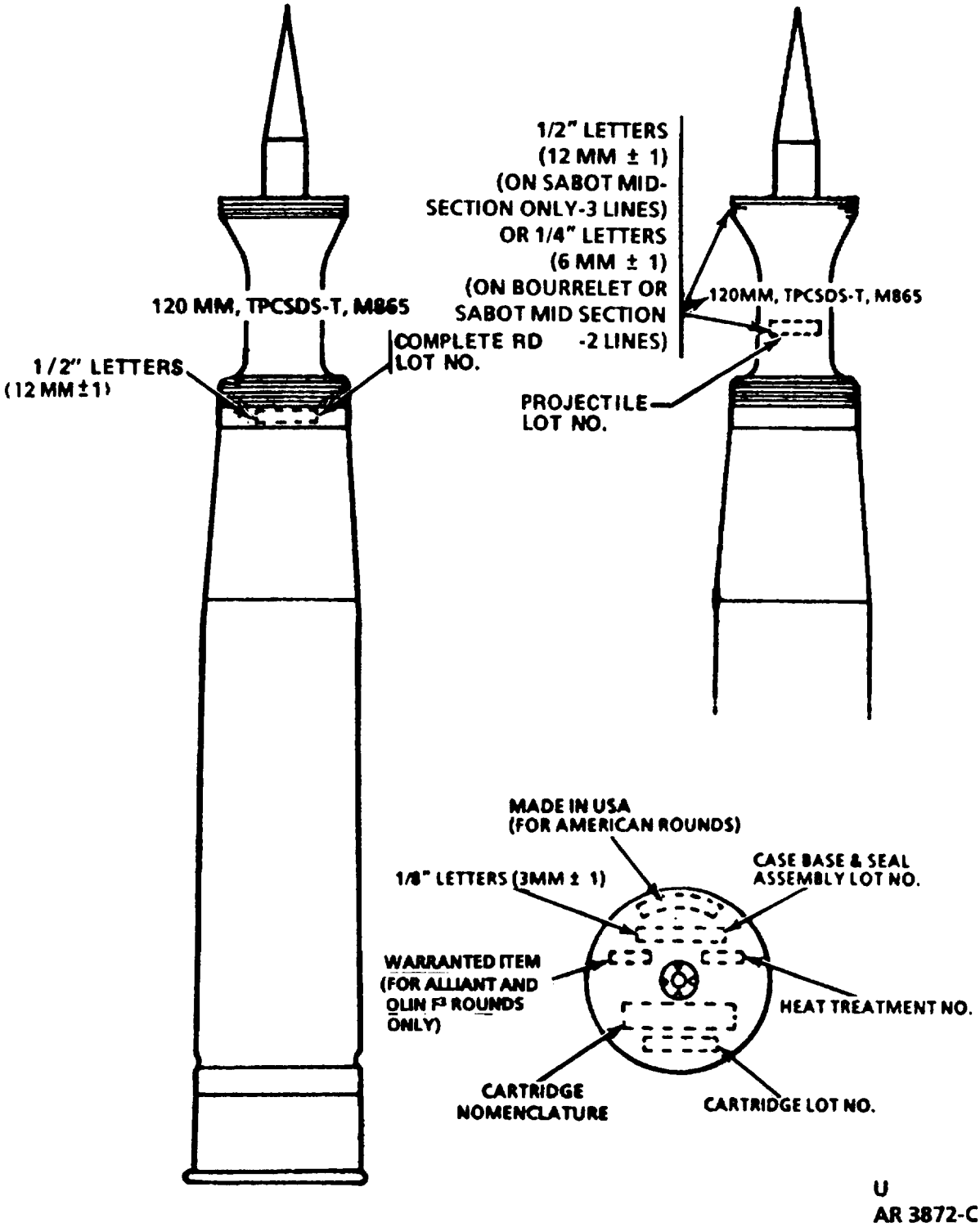

Figure 1. Typical marking for 120-mm gun cartridges, M865

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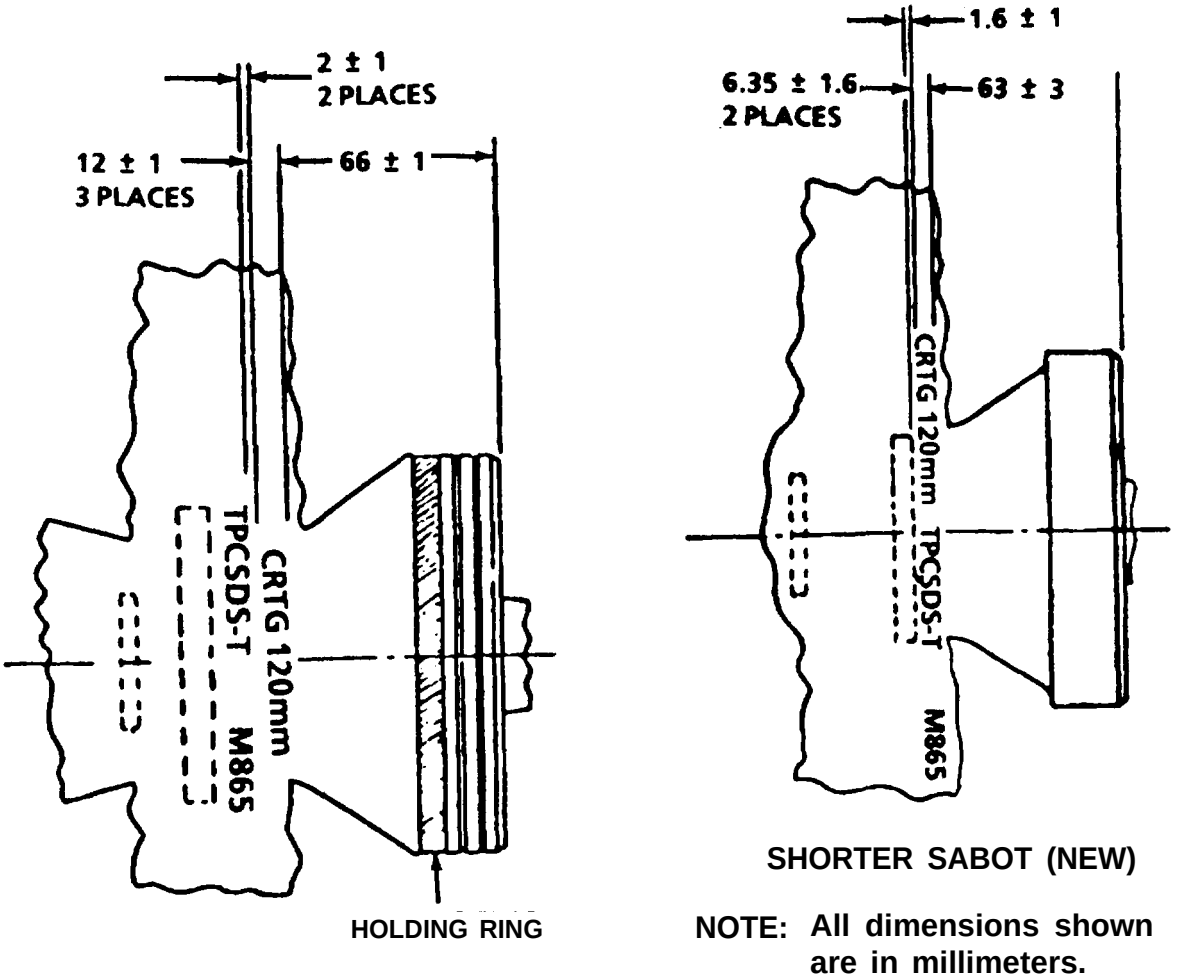

Figure 2. Differences between standard and shorter sabot for 120mm gun cartridge, M865.

Army-Authorized Ammunition for Guns. The authorization with the introduction of the slotted cone/reduced length sabot M865 (including the Alliant F^3 design round and the Olin F^3 design round) does not change, but it should be noted that cartridges with NSN 1315-01-288-5545 must be replaced in metal containers of the same lot number due to the shortened sabot requiring a different internal container support.

Repair Parts List. The introduction of the slotted cone/reduced length sabot M865 will require the addition of a second container for specific use with these rounds (NSN 1315-01-288-5545). The Repair Parts List for TM 9-1300-251-20 and TM 9-1300-251-34 should be annotated respectively as follows:

SMR code	XB000
Part number	12913178
Federal supply code for mfg	19200
Description	Container Ammunition Metal PA 116 for cartridge, 120-mm, TPCSDS-T, M865
Unit of measure	each
Quantity incorporated in unit	1

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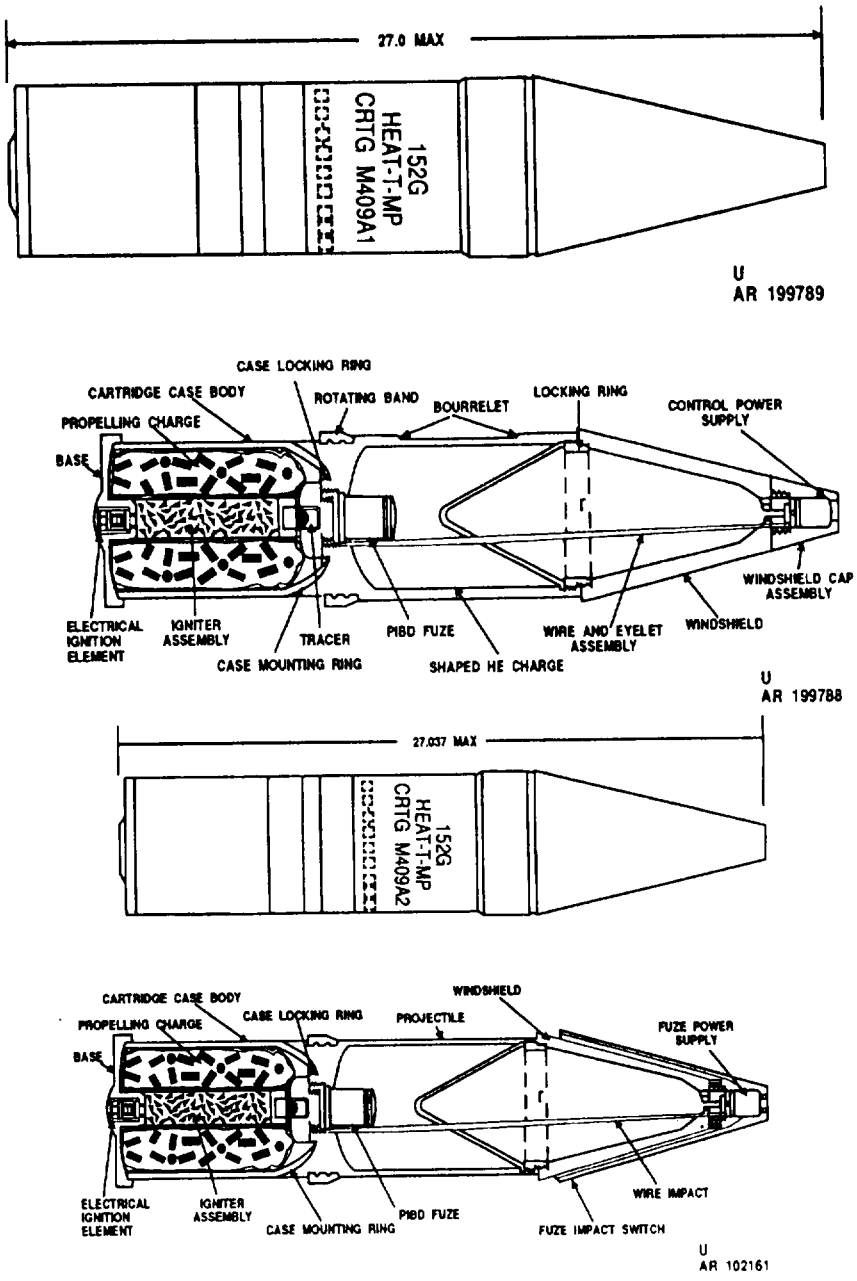
CARTRIDGE, 152-MILLIMETER: HEAT-T-M, M409A2, M409A1 AND M409



Type Classification:

M409A2 ------- Std DA Letter 1976
M409A1 ------- Std AMCTC 8865
M409 ---------- C&T AMCTC 8965

Use:

This cartridge is fired from 152-mm gun-launchers primarily as an armor-defeating round with additional antipersonnel capability.

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Description:

The projectile consists of a forged steel body fitted with a steel windshield and a fluted copper cone liner to shape the high explosive charge. The liner is held in place by a steel locking ring. The windshield is threaded to the locking ring and houses an insulator and wire eyelet connector assembly. The wire connector assembly connects the fuze with the control power supply housed in a two-piece windshield cap. The control power supply provides the point-initiating, base-detonating fuze with electrical energy The projectile is loaded with Composition B, and the fuze is fitted in a cavity of the explosive charge. The tracer is contained in the base plug and is assembled to a steel fuze locking cup in the base of the projectile. A sintered iron rotating band, forward of the base, provides spin and obturation. Cartridge Case M205 used in M409A2 and M409A1 is a two-piece assembly of base and body made of high-density felted nitrocellulose, inert fibers, and resin. The body, containing a bagged propelling charge, is attached to the projectile by a steel mounting ring and aluminum case locking ring. The base houses the electric ignition system and is cemented to the body with a special nitrocellulose lacquer. Cartridge Case M157 used in Cartridge M409 is similar to the M205 in shape and function, but is of a different non-metallic flammable material. The M157 case is more vulnerable to fracture on impact than the M205, and the igniter primer is of a different design, The body is attached to the projectile by epoxy resin and a case locking ring.

Functioning:

Electric current from the firing mechanism of the weapon initiates the ignition element/initiator. The resulting flash ignites the propellant, and the burning propellant generates gases to force the projectile from the gun tube and concurrently ignite the tracer. When the round is used against armor; electrical energy from the control power supply in the nose of the projectile is fed to the fuze on impact. Functioning of the fuze detonates the shaped explosive charge of Composition B to collapse the copper cone and create a high-velocity focused shock wave. The intensity of the shock-wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target. For antipersonnel use, the round is fired so the fuze will function on graze or direct impact on target. Blast and fragmentation created by detonation of' the explosive charge inflicts casualties.

Difference Between Models:

The M409A2 model has the improved M509A1 PIBD fuze and has the full frontal area impact switch enabling the projectile to be effective on all areas of the ogive.

Tabulated Data:

Complete round:
- Type ---------- HEAT-T-MP
- Weight ---------- 48.5 lb
  M4WIA2, 50.5 lb
- Length ---------- 27.0 in.
- Cannon used with ---------- M81 series, M162

Projectile:
- Body material ---------- Forged steel
- Color (Old) ---------- Black w/yellow markings
  (New) ---------- Black w/white markings and yellow band
- Filler and weight ---------- Comp, B, 6.3 lb

Components:	M409A2	M409A1	M409
Cartridge case	M205	M205	M157
Propelling charge	M189	M189	M189
Primer	M91	Electric	M91
Tracer	M13	M13	M13
Fuze	M539A1	PIBD-M539	XM539E1

Performance:
- Maximum range ---------- 9900 yd (9000 m)
- Muzzle velocity ---------- 2240 fps (683 reps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- + 125°F (+ 52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

* Packing ---------- 1 cartridge per fiber container; 1 container per wooden box

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*Packing Box:
Weight ---------- 97.5 lb
Dimensions ---------- 42-1/8 x 12-9/16 x 13-11/32 in.
Cube ---------- 4.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0006
DOD hazard class ---------- 1.1
Storage compatibility ---------- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D381
Drawing number (M409) ------- 9204196
(M409A1) ---------- 9257471
(M409A2) ---------- 9323952

Operational Characteristics:

Do not remove barrier bag until round is being chambered. Unprotected cartridge cases where barrier bags have been removed are flammable and can be ignited accidentally by burning cigarettes, smoldering residue embers, and open flames, etc. Neoprene barrier bags may be difficult to remove at -25°F or below.

Limitations:

Probe adapter will not be used when firing rounds assembled with Cartridge Case M205.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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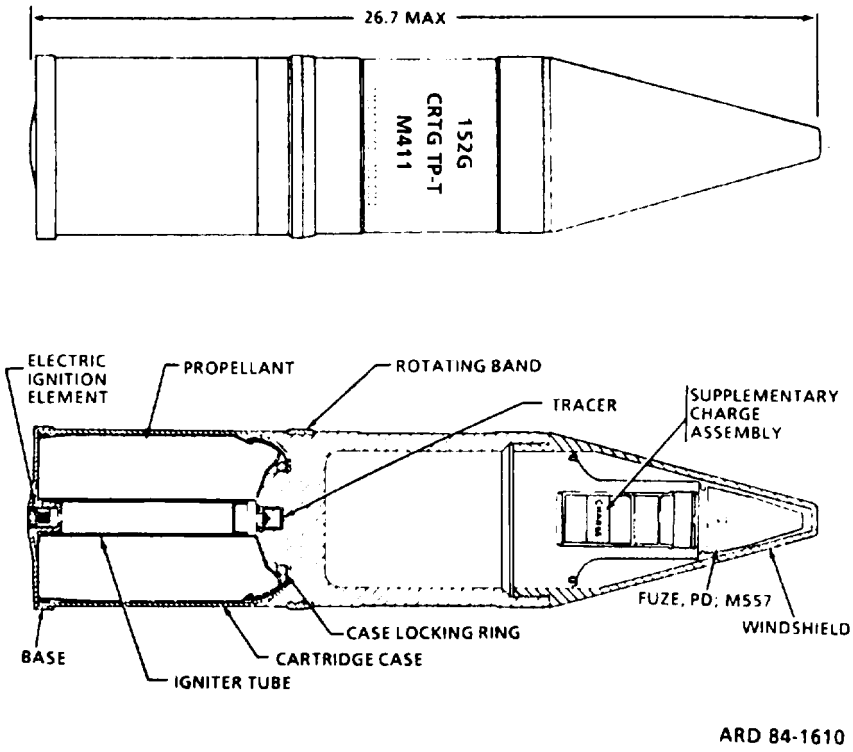
CARTRIDGE, 152-MILLIMETER: TP-T, M411



Type Classification:

C&T, AMCTC 9103 dtd 1972.

Use:

This cartridge is designed for training in gunnery and fire control with 152-mm gun launchers.

Description:

The M411 cartridge has an M557 PD fuze and a supplementary charge for spotting purposes in the aluminum spike; otherwise, the projectile is hollow. A tracer is in the base of the projectile for observation of the trajectory The hollow projectile is secured to a cartridge case of combustible material. The case is filled with bagged propellant and equipped with an electrical ignition element.

Functioning

Electric current from the firing mechanism initiates the ignition element/primer and the resulting flash ignites the propellant. The burning propellant generates gases which force the projectile from the gun tube and concurrently ignite the tracer. This cartridge has a functioning fuze and spotting charge.

Tabulated Data:

Complete round:

Type	Target Practice
Weight	48.8 lb
Length	26.7 in.
Cannon used with	M81 series, M162

Projectile:

Body material	Steel
Color	Blue w/white markings and yellow band
Filler and weight	TNT 0.30 lb

Components:

Cartridge case	XM157
Propelling charge	M189
Primer	M91
Tracer	M13
Fuze	M557

Temperature Limits:

Firing:

Lower limit	-40°F
Upper limit	+125°F

Storage:

Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)

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*Packing:
M411 ---------- 1 round per fiber container; 1 container per wooden box

*Packing Box:
Weight ---------- 97.5 1b
Dimensions ---------- 10-15/32 x 10-15/32 x 36-1/8 in.
Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
DOD hazard class ---------- (12) 1.2
Storage compatibility ---------- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D380
Drawing number ---------- 9210425

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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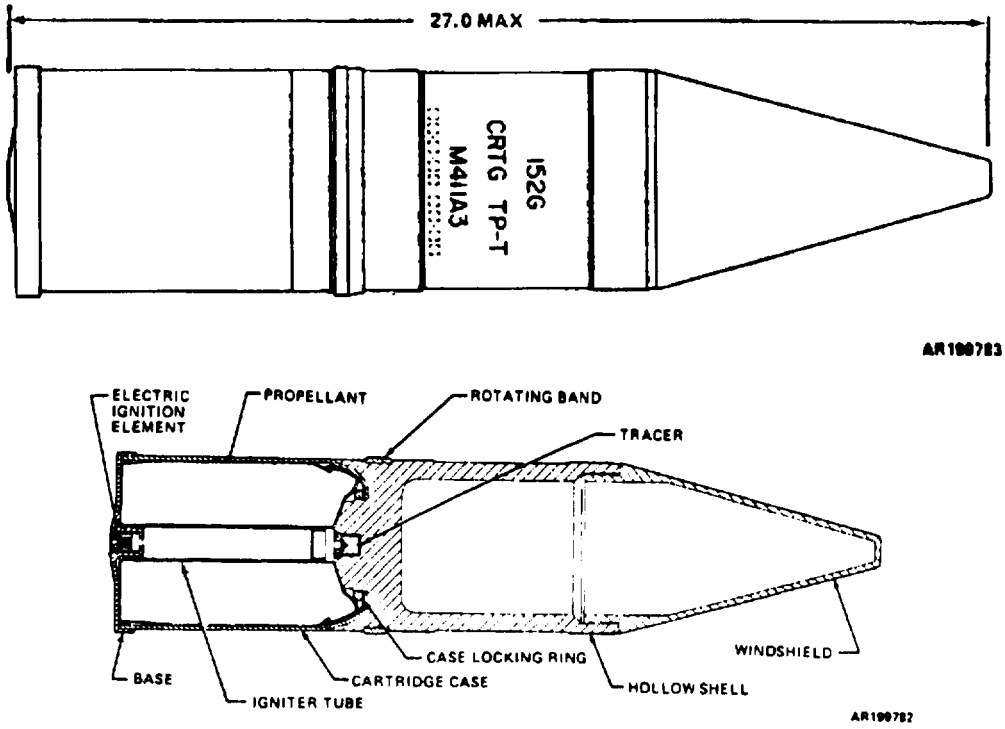
CARTRIDGE, 152-MILLIMETER: TP-T, M411A3, M411A2, AND M411A1



Type Classification:

M411A3 ----- Std AMCTC 9103 dtd 1972.
M411A2 ----- Std AMCTC 9103 dtd 1972.
M411A1 ------ C&T, AMCTC 9103 dtd 1972.

Use:

This cartridge is designed for training in gunnery and fire control with 152-mm gun launchers.

Description:

Cartridges of the M411 series consist of a hollow projectile secured to a cartridge case of combustible material, and simulate for practice purposes the 152-mm, HEAT-T-MP, M409 series. Model M411A3 (XM411E7) is inert except for a tracer in the base of the projectile for observation of the trajectory. The M205 cartridge case is filled with bagged propellant and is equipped with an electrical ignition element, Model M411A2 is identical with M411A3 except for use of the older M157 cartridge case and M91 electrical primer. M411A1 has a multipiece projectile including steel body, aluminum spike, and steel windshield.

Functioning:

Electric current from the firing mechanism initiates the ignition element/primer and the resulting flash ignites the propellant. The burning propellant generates gases which force the projectile from the gun tube and concurrently ignite the tracer. Except for the tracer, which marks the flight of the projectile, Cartridges M411A3, M411A2, and M411A1 are nonfunctioning.

Tabulated Data:

Complete round:
- Type ---------- Target Practice
- Weight:
  - M411A3 ---------- 48.8 lb
  - M411A2 ---------- 49.8 lb
  - M411A1 ---------- 49.8 lb
- Length:
  - M411A3 ..... 27.0 in.
  - M411A2 ---------- 27.1 in.
  - M411A1 ---------- 26.9 in.
- Cannon used with ---------- M81 series. M162

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Tabulated Data: (cont.)

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white marking and yellow band
- Filler and weight:
  - M411A3 ---------- N/A
  - M411A2 ---------- N/A
  - M411A1 ---------- N/A

Components:
- Cartridge case:
  - M411A3 ---------- M205
  - M411A2 ---------- M157
  - M411A1 ---------- M157
- Propelling charge ---------- M189
- Primer:
  - M411A3 ---------- N/A
  - M411A2 ---------- M91
  - M411A1 ---------- M91
- Tracer: ---------- M13
- Fuze:
  - M411A3 ---------- N/A
  - M411A2 ---------- N/A
  - M411A1 ---------- N/A

Performance:
- Maximum range ---------- 9000 m
- Muzzle velocity ---------- 2,240 fps

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing:
- M411A1, M411A2 ---------- 1 round per fiber container; 1 container per wooden box
- M411A3 ---------- 1 round per metal container

*Packing Box:
- Weight ---------- 97.5 lb

Metal Container (M411A3):
- Weight ---------- 87.0 lb
- Dimensions ---------- 10-15/32 x 10-15/32 x 36-1/8 in.
- Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0242
DOD hazard class ---------- 1.3
Storage compatibility ---------- C
DOT shipping class ---------- B
DOTdesignation ---------- AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE. (M411): AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D383 (M411A3, M411A2, and M411A1)
Drawing number ---------- 9266944, (M411A3); 9242430, (M411A2); 9233376. (M411A1)

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
'I'M 9-1300-251-20

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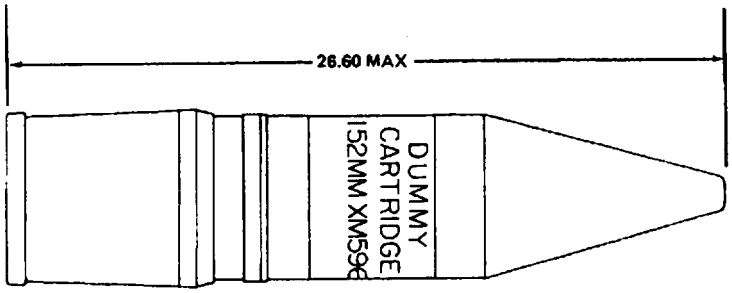
CARTRIDGE, 152-MILLIMETER: DUMMY, M596



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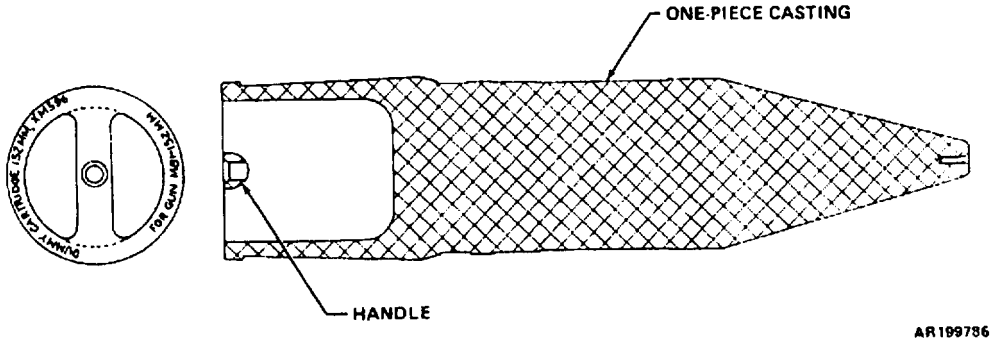

AR199786

Type Classification:

Std AMCTC 5909 dtd 1968.

Use:

This dummy cartridge is used as a drill round to train troops in handling ammunition and loading the 152-nun, M81 gun-launcher.

Description:

This cartridge simulates a loaded round of 152-mm ammunition in size, weight, and center of gravity. The cartridge is a one-piece alloy casting with a protective hard anodized coating and has a life expectancy of 75,000 loadings. The material results in negligible wear to the gun tube. The hollowed-out base provides a handle for removal of the round after practice loading.

Functioning:

Projectile is completely inert and does not function.

Tabulated Data:

Complete round:	
Type	Dummy
Weight	51.0 lb
Length	26.60 in.
Cannon used with	M81
Projectile:	
Body material	Aluminum alloy
Color:	
(Old)	Black or blue w/white marking
(New)	Bronze w/white markings
*Packing	1 round per wooden box
*Packing Box:	
Weight	69.0 lb
Dimensions	29-7/8 x 8-1/8 x 8-29/32 in.
Cube	1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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Shipping and Storage Data:

UNO serial number	N/A
DOD hazard class	N/A
Storage compatibility	N/A
DOT shipping class	C
DOT designation	NON-EXPLOSIVE AMMUNITION
DODAC	1320-D500
Drawing number	8430306

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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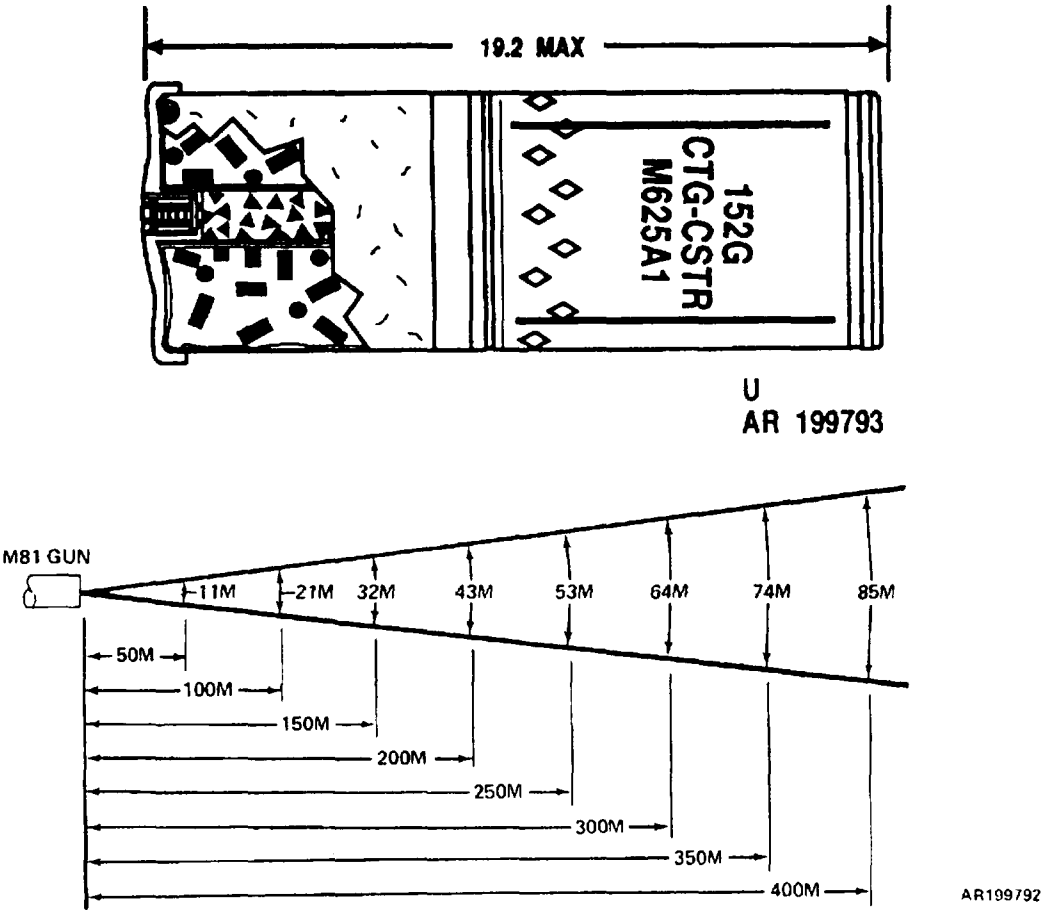
CARTRIDGE, 152-MILLIMETER: CANISTER, M625A1 AND M625



Type Classification:

M625A1---- Std AMCTC 8966 dtd 1972.
M625 ------- C&T, MSR 11756003.

Use:

These canister cartridges are used in 152-mm gun-launchers and are intended primarily for antipersonnel use at close range. The cartridges are effective in dense foliage.

Description:

The canister-type projectile for M625 and M625A1 cartridges consists of an aluminum base and body threaded together. Four axial grooves, 90 degrees apart, extend from the forward end of the body for approximately 3/4 of its length. The body contains steel flechettes loaded in five separate bays. The bay assemblies are secured by a closing cup crimped over the forward end of the body. A bleed hole in the base of the projectile allows propellant gases to build up internal pressure in the body to facilitate breakup. The cartridge case is a two-piece assembly of base and body made of high-density felt nitrocellulose, inert fibers, and resin. The cylindrical body of the M205 case containing a bagged propelling charge is attached to the projectile by a steel mounting ring and aluminum locking ring. The base houses the electrical ignition element and is cemented to the body with a special nitrocellulose lacquer.

Functioning:

Electrical current from the firing mechanism of the weapon initiates the ignition element/initiator. The resultant flash ignites the propellant and the burning propellant generates gases that force the canister projectile from the gun tube. Immediately after the projectile leaves the gun tube, centrifugal force and internal pressure from the propellant gases split the canister at grooves releasing the flechettes. The flechettes disperse forward in a conical pattern as a result of the combination of forward and centrifugal forces.

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Difference Between Models:

Canister M625A1 and M625 are identical except for the cartridge case, which is more vulnerable to fracture on impact in M625. M625 has a different ignition element and the method of attachment of the cartridge case to the projectile is not the same.

Tabulated Data:

Complete round:
- Type ---------- Canister
- Weight ---------- 48.5 lb
- Length ---------- 19.2 in.
- Cannon used with ---------- M81 series, M162

Projectile:
- Body material ---------- Aluminum
- Color ---------- Olive drab w/white diamonds and white marking
- Filler and weight ---------- Flechettes-10,000, 15.2 lb

Components:	M625A1	M625
Cartridge case	M205	M157
Propelling charge	M189	M189
Primer	Electrical	M91

Performance:
- Maximum effective range -- 400 m
- Muzzle velocity ---------- 2,260 fp

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- + 160°F (for period not more than 4 hr/day)

*Packing ---------- 1 cartridge per fiber container; 1 container per wooden box

*Packing Box:
- Weight ---------- 97.5 lb
- Dimensions ---------- 39-1/2 x 12-1/2 x 13-3/16 in.
- Cube ---------- 4.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0242
- DOD hazard class ---------- 1.3
- Storage compatibility ---------- E
- DOT shipping class ---------- B
- DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILE
- DODAC ---------- 1320-D390
- Drawing number ---------- 9219469, (M625); 9257471, (M625A1)

Operational Characteristics:

Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed can be ignited accidenally by burning cigarettes, smoldering residue, embers, open flame, etc. Do not remove ballistic protective cover until round is removed from stowage rack for firing. Do not remove barrier bag until round is being chambered. Neoprene barrier bags may be difficult to remove at -25°F or below.

Limitations:

Overhead firing of canister cartridge is prohibited. Do not use probe adapter when firing rounds assembled with Cartridge Case M205.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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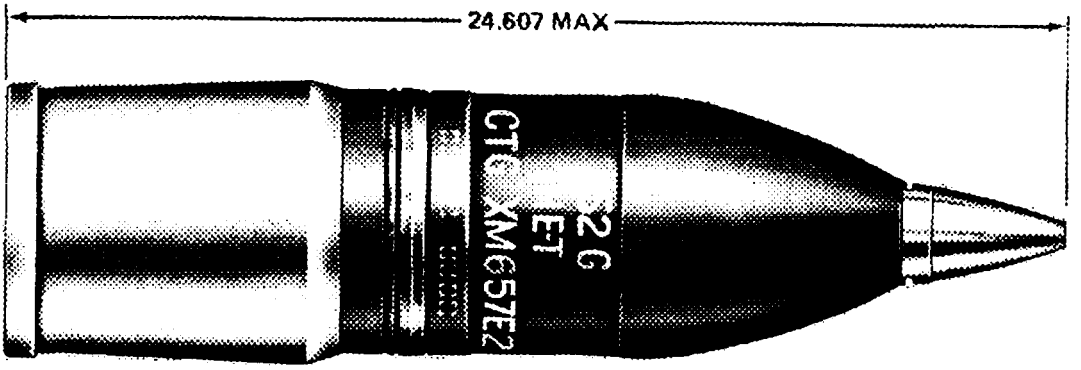
CARTRIDGE, 152-MILLIMETER: HE-T, M657



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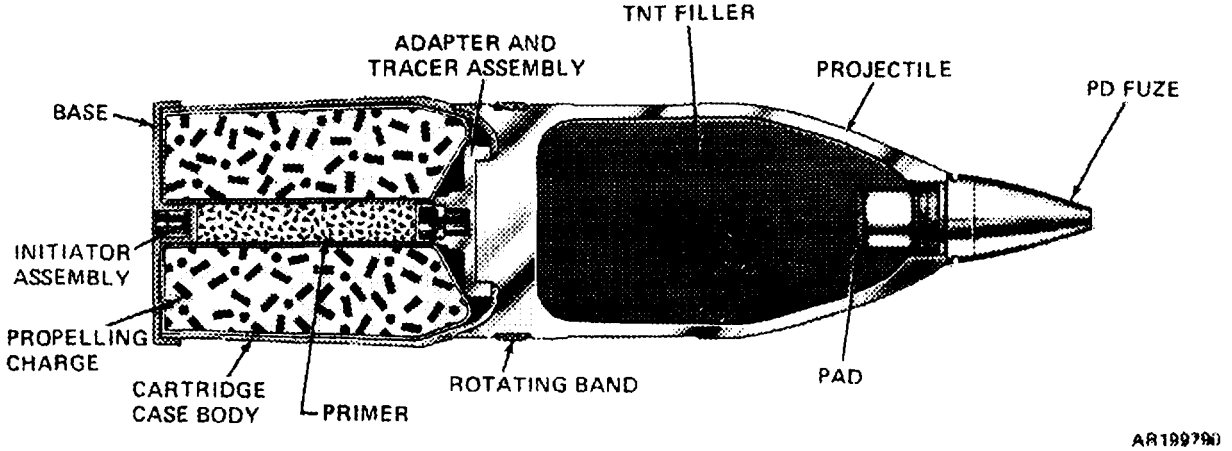

AR199790

Type Classification:

C&T AMCTC 9193 dtd 1972.

Use:

This fixed ammunition cartridge is a high-explosive round for 152-mm gun launchers, employed against light materiel and personnel.

Description:

The complete round consists of a one-piece, forged steel projectile loaded with high explosive assembled to a nonmetallic cartridge case. The projectile is fitted at the nose with a point-detonating (PD) fuze and at the base with a tracer adapter. The adapter is threaded to the projectile base, and is designed to secure the projectile to the cartridge case as well as to hold the tracer. A gilding metal rotating hand encircles the projectile 1-3/4 inches forward of the base. Cartridge Case M157 used with this round is a two-piece assembly of base and body, manufactured from nitrocellulose and relatively vulnerable to fracture from impact. The cylindrical body, containing the bagged propelling charge, is attached to the projectile by epoxy resin and a case locking ring, secured by the projectile base adapter. The base of the cartridge case houses the electric primer initiator. The primer tube is of nitrocellulose and contains a black powder charge.

Functioning:

Electric current from the firing mechanism of the weapon initiates the ignition element/initiator. The resultant flash through the primer tube ignites the propellant, and the burning propellant generates gases which ignite the tracer and force the projectile from the gun tube. The superquick point-detonating fuze functions on impact with the target or on graze. Functioning of the fuze detonates the explosive charge which creates blast and fragmentation.

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Tabulated Data:

Complete round:
- Type ---------- HE-T
- Weight ---------- 48.5 lb
- Length ---------- 24.6 in.
- Cannon used with ---------- M81

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow marking
- Filler and weight ---------- TNT, 9.5 lb

Components:
- Cartridge case ---------- M157
- Propelling charge ---------- M190
- Primer ---------- M117
- Tracer ---------- M13
- Fuze ---------- PD, M720 or XM720

Performance:
- Maximum Range ---------- 9000 m
- Muzzle velocity ---------- 2240 fps

Temperature Limits:

Firing:
- Lower limit ---------- +40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 cartridge per fiber container; 1 container per wooden box

*Packing Box:
- Weight ---------- 97.5 1b
- Dimensions ---------- 39-1/2 x 12-1/2 x 13-3/16 in.
- Cube ---------- 4.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
DOD hazard class ---------- (12) 1.2
Storage compatibility ---------- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D592
Drawing number ---------- 9223763

Operational Characteristics:

Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed, can be ignited accidentally by burning cigarettes, smoldering residue, embers, open fire, etc. Do not remove ballistic protective cover until round is removed from stowage rack for firing. Do not remove barrier bag until round is being chambered. Neoprene barrier bags may be difficult to remove at -25°F or below.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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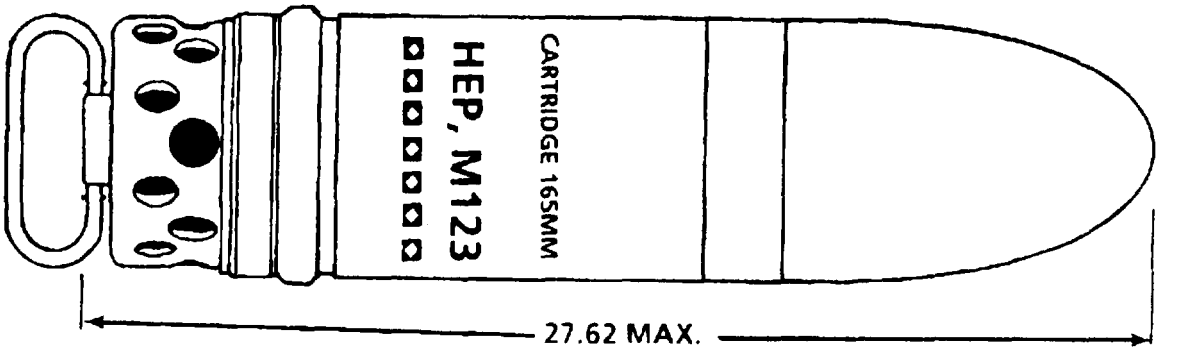
CARTRIDGE, 165-MILLIMETER: HEP, M123A1 AND M123



AR 101986A

Type Classification:

Std AMCTC 4266 dtd 1966.

Use:

This cartridge is a chemical energy round designed for demolition. It is capable of damaging or destroying the type of structures (log walls, concrete bunkers, etc.) and equipment (abandoned vehicles etc.) encountered on a battlefield. It is also effective as an antipersonnel round.

Description:

The M123A1 projectile is made of drawn plate steel with a blunt ogive. A copper rotating band encircles the projectile just forward of the base. The projectile is cast loaded with a filler of approximately 35 pounds of Composition A3. A pressed felt washer and disk are positioned between the explosive charge and the base of the projectile to buffer the explosive from the shock of the setback, The base of the projectile is fitted with a base-detonating fuze and sealed with a steel plug. It is threaded externally for attachment to the mouth of the cartridge case. The cartridge case contains the propelling charge and a bagged supplementary igniter charge of 220 grains of black powder, heat-sealed in a olyethylene liner, which provides an improved moisture barrier over that in the M123. An electric primer is fitted to the base of the cartridge case, The handle assembly attached to the base of the primer is fitted with a quick-release mechanism which permits its removal after the round is loaded into the weapon.

Functioning:

In firing an electric current transmitted by the firing mechanism in the weapon activates the primer, which ignites the propellant. The propellant gases, escaping through perforations in the cartridge case, force the cartridge out of the gun tube and propel it to the target. Unlike other types of fixed ammunition, the cartridge case remains fixed after firing and leaves the weapon with the projectile. The cartridge is spin stabilized in flight. Upon impact, the functioning of the fuze detonates the explosive.

Difference Between Models:

The M123 differs from the M123A1 in the following design aspects, The handle assembly requires 4 or 5 turns to release, in lieu of one-quarter turn; the base plug is aluminum instead of steel, and the cartridge case is a three-piece welded design with a plastic liner. The projectile is loaded with a filler of Composition A3.

Tabulated Data:

Complete round:

Type	HEP
Weight	67.60 lb
Length	27.62 in.
Cannon used with	M135

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Tabulated Data: (cont.)

Projectile:
- Explosive filler ---------- 35 lb, Comp A3
- Body material ---------- Steel
- Color ---------- Olive drab w/yellow markings and black band
- Cartridge case ---------- M104

This is a two-piece welded steel perforated basket type. The mouth is threaded for attachment to the projectile, a well in the base accommodates the primer.

- Length ---------- Approx 4 in.
- Diameter ---------- 6.5 in.
- Primer ---------- M73
- Fuze BD ---------- M62A2

Ballistics:

Maximum range ---------- 1000 yd (914 m)
Muzzle velocity ---------- 850 fps (259.08 reps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0 °C)

Storage:
- Lower limit ---------- -80°F(-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.l°C) (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container: 1 container per wooden box

*Packing box:
- Weight w/ctg ---------- 94.0 lb
- Dimensions ---------- 34-13/16 x 8-3/4 x 9-13/16 in.
- cube ---------- 1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0167
DOD hazard class ---------- 1.1
Storage compatibility group -- F
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1320-D570
Drawing number ---------- 8845043

Limitations:

Functional reliability will be degraded when impacting soft targets such as marshy, sandy, clay, mud, or snow covered terrain.

References:

TM 9-2350-222 -10-1
TM 9-2350 -222-10-2
TM 9-2350-222-10-3
AMC-P 700-3-3
SB 700-20

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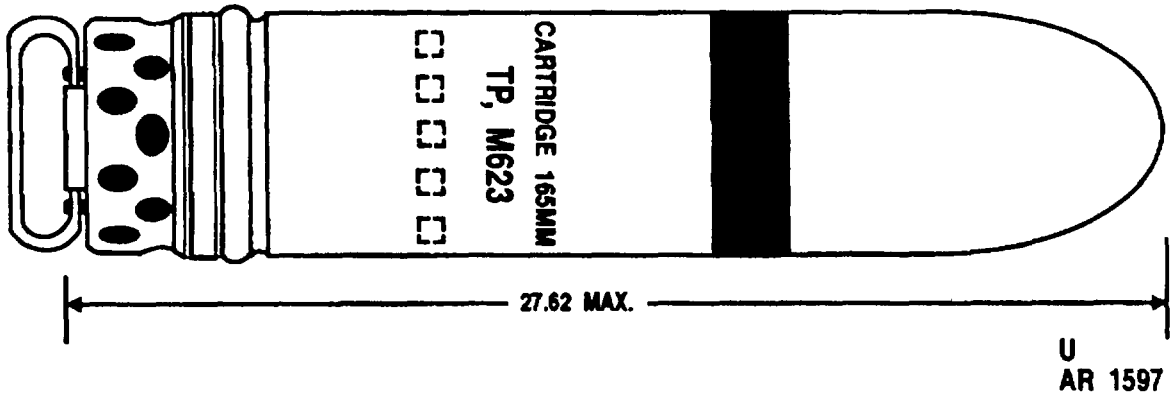
CARTRIDGE, 165-MILLIMETER: TP, M623



Type Classification:

Std AMCTC 8415 dtd July 1971.

Use:

This cartridge is similar in appearance to Cartridge HEP M123A1 and is used for target practice with the M135 gun cannon.

Description:

Except for the projectile and fuze, the target practice cartridge is assembled with the same components as the HEP cartridge. The primary difference between the two rounds is that the TP projectile contains an inert filler in lieu of explosive, and is fitted with either a solid base plug or a dummy fuze assembled to the standard M123A1 base plug. The handle assembly attached to the base of the primer, is fitted with a quick-release mechanism which permits its removal after the round is loaded into the weapon.

Functioning:

In firing, an electric current transmitted by the firing mechanism in the weapon activates the primer, which ignites the propellant. The propellant gases, escaping through perforations in the cartridge case, force the cartridge out of the gun tube and propel it to the target. Unlike other types of fixed ammunition, the cartridge case remains fixed after firing and leaves the weapon with the projectile. The cartridge is spin stabilized in flight.

Tabulated Data:

Complete round:

Type	Target Practice
Weight	67.6 lb
Length	27.62 in.
Cannon used with	M135

Projectile:

Inert filler	35 lb
Body material	Steel
Color	Blue w/white markings
Cartridge case	M104

This is a two-piece welded steel perforated basket type. The mouth is threaded for attachment to the projectile, a well in the base accommodates the primer.

Length	Approx 4 in.
Diameter	6.5 in.
Propellant	M2 (2.12 lb)
Primer	M73
Fuze	Inert or solid base plug

Ballistics:

Maximum range	1000 yd (914 m)
Muzzle velocity	850 fps (259.08 mps)

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Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°C) (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 1 container per wooden box
*Packing Box:	
Weight w/cartridge	94.0 lb
Dimensions	30-1/16 x 7-3/8 x 7-7/16 in.

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
DOD hazard class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON W/INERT LOADED PROJECTILE
DODAC	1320 -D590
Drawing number	9219045

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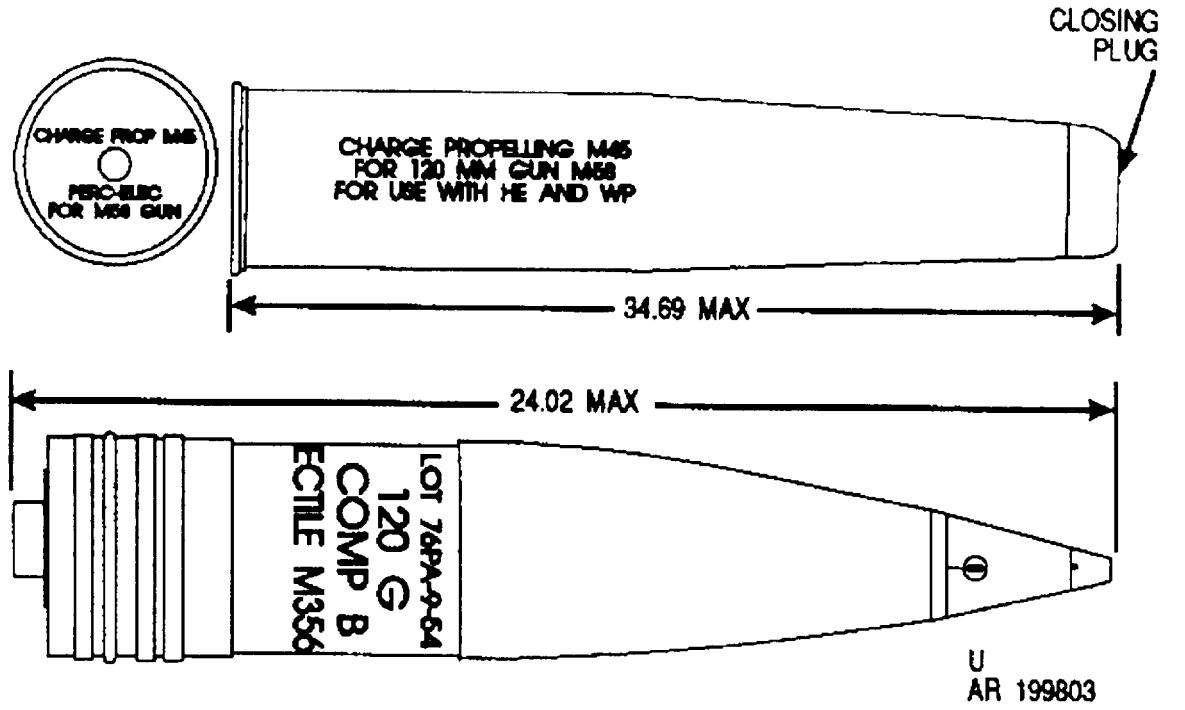
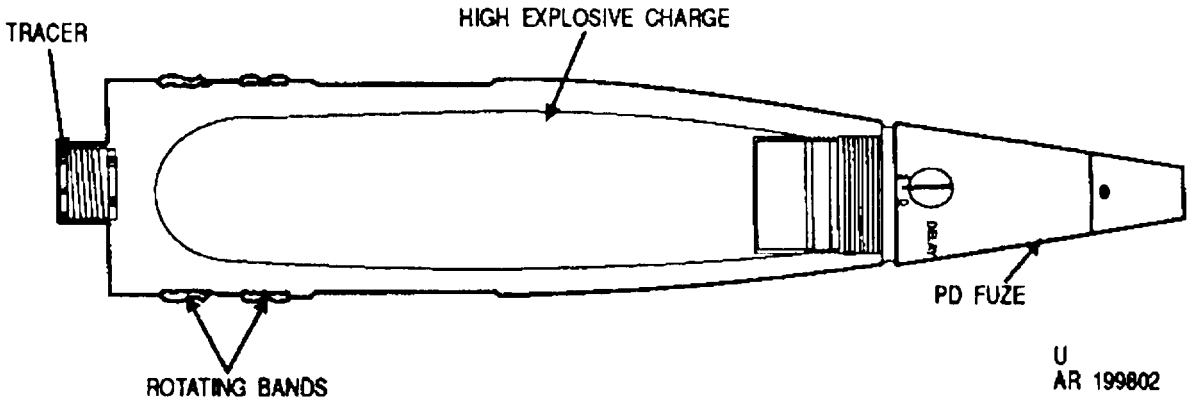
PROJECTILE, 120-MILIMETER: HE-T, M356 (T15E3)





Type Classification:

Std OTCM 36841 dtd 1958.

Use:

This separated round is used in 120-mm tank gun Cannon M58 for fragmentation, blast, or mining effect.

Description:

The complete round consists of a projectile, a propelling charge assembly, and a point-detonating (PD) fuze. The exterior of the projectile body has two gilding metal rotating bands and a boss on the base. A tracer is screwed into the boss. The propelling charge is contained in a brass cartridge case. The propellant is in a

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silk bag, held in place in the cartridge case by distance wadding. The cartridge case is closed with a closing plug.

Functioning;

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the projectile from the gun bore and ignites the tracer. The burning tracer provides a visible red trace for approximately 3 seconds. Upon impact, the fuze functions to detonate the Composition B explosive causing blast and fragmentation of the projectile at the target.

Tabulated Data:

Projectile w/fuze:	
Type	HE-T
Weight	50.41 lb
Length	24.02 in.
Cannon used with	M58
Body material	Steel
Color	Olive drab w/yellow marking
Filler and weight	Composition B, 7.84 lb
Propelling charge assembly weight	38,75 lb
Components:	
Cartridge case	M109 (T25) (brass)
Propelling charge assembly	M45 (T21E1)
Propellant	M31
Primer	M67, percussion electric
Closing plug	M6
Tracer	M5 series
Fuze	PD-M557, M572
Performance:	
Maximum range	18,206 m (19,910 yd)
Muzzle Velocity	760 mps (2,500 fps)

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+ 125°F (+52°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+ 160°F (+ 71.1°C)(for period not more than 4 hr/day)
*Packing	Projectile and propelling charge in separate fiber containers; 2 fiber containers (1 round) per wooden box
*Packing Box:	
Weight	142.65 lb
Dimensions	41 x 10-27/32 x 15-9/16 in.
Cube	3.9 cu ft.

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
DOD hazard class	(18) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-CS00
Drawing number	8822495

Limitations:

None.

References.

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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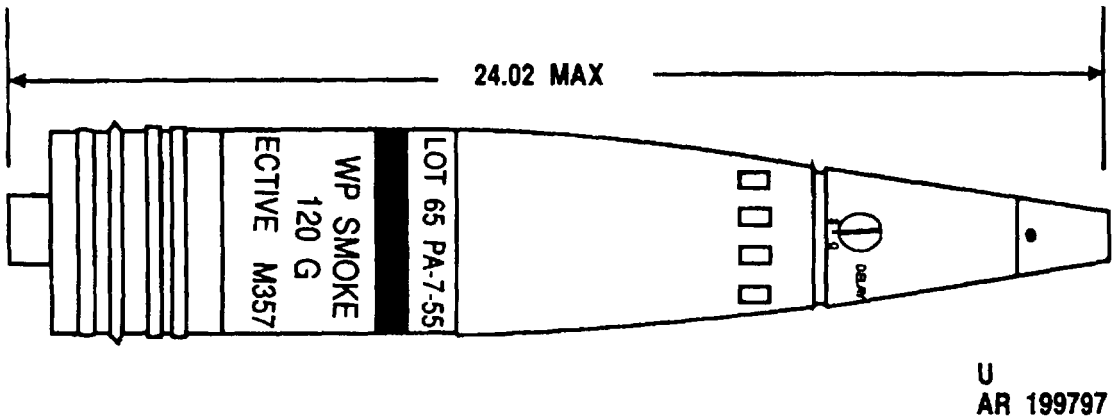
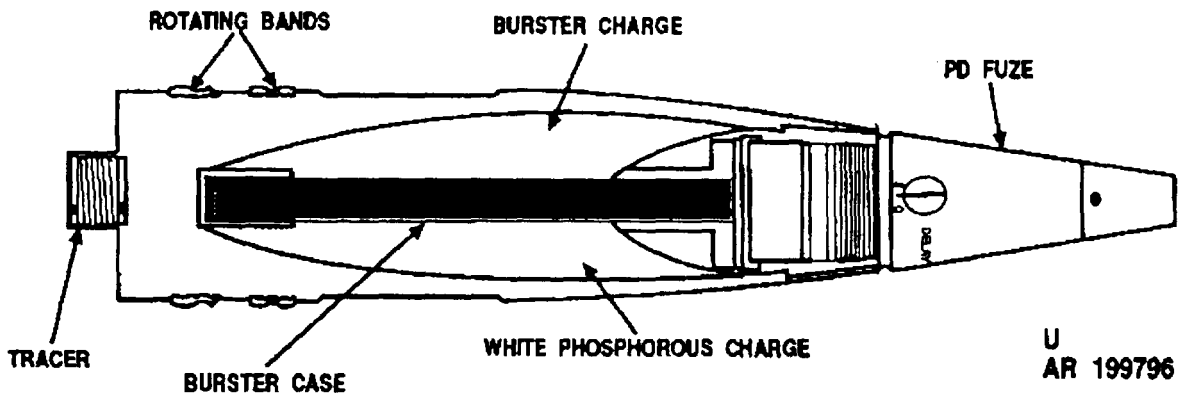
PROJECTILE, 120-MILLIMETER: SMOKE, WP-T, M357 (T16E4)





Type Classification:

Std OTCM 37741 dtd 1961.

Use:

This round is used in 120-mm tank guns for target marking and smoke screening. It also has a limited incendiary action.

Description:

The complete round consists of projectile and propelling charge. The projectile is a forged steel body fuzed with a point-detonating (PD) fuze. Assembled to the projectile are two gilding metal rotating bands forward of the base. A boss containing a tracer is threaded into the base. A burster casing is press-fitted into the projectile nose with the other end seated in a well at the base of the projectile. A burster charge of tetrytol is contained in the burster casing. The propelling charge consists of a brass cartridge case containing the propelling charge in a silk bag. Distance wadding is used to hold the silk bag in place, and a plastic closing plug is used to close the mouth of the cartridge case. An electric percussion primer is installed in the base of the cartridge case.

Functioning:

When the electric percussion primer is initiated in the breech of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the projectile from the gun bore and ignite the tracer. The tracer provides a visible red trace during the first three seconds of' projectile flight. The PD fuze functions on impact, detonating the burster charge. Explosion of the burster charge shatters the projectile body and disperses the white phosphorous. Upon contact with the air, white phosphorous spontaneously ignites and burns, producing a dense white smoke and flaming particles.

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Tabulated Data:

Projectile w/fuze:
- Type ---------- Smoke WP-T
- Weight ---------- 50.41 lb
- Length ---------- 24.02 in.
- Cannon used with ---------- M58

Projectile:
- Body material ---------- Steel
- Color ---------- Light green w/yellow band and light red marking
- Filler and weight ---------- White phosphorous (WP) 7.5 lb

Components:
- Propelling charge assembly- M45 (T21E1)
- Cartridge case ---------- M109 (T25)
- Propellant ---------- M31
- Primer ---------- M67 (T85E3)
- Tracer ---------- M7
- Burster casing ---------- T20
- Burster charge ---------- M41 (T18) (1700 grains tetrytol)
- Fuze ---------- PD-M557, M520 series, M564, M572

Performance:
- Maximum range ---------- 18,206 m (19,910 yd)
- Muzzle velocity ---------- 760 mps (2,500 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- + 125°F (+52°C)

*Packing ---------- Projectile and propelling charge assembly in separate fiber containers; 2 fiber containers (1 round) per wooden box

*Packing Box:
- Weight ---------- 142.65 lb
- Dimensions ---------- 41 x 10-27/32 x 15-9/16 in.
- Cube ---------- 3.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
DOD hazard class ---------- (12) 1.2
Storage class/SCG ---------- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- l315-C806
Drawing number ---------- 8826688

Limitations:

Since the burster in the ammunition is loaded with tetrytol, it should not be stored or fired at temperatures exceeding +125°F.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractial, store rounds on bases, so that if WP melts, it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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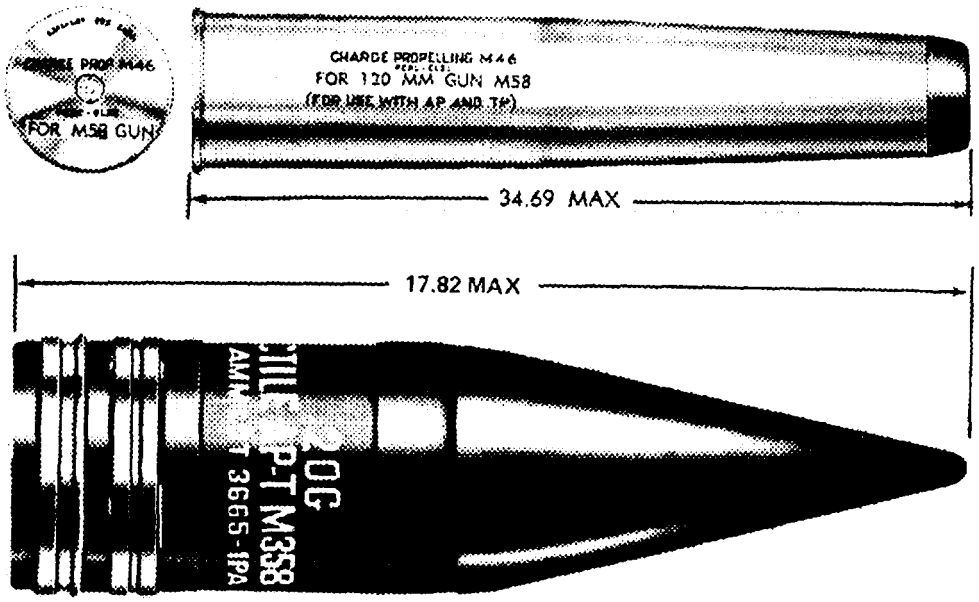
PROJECTILE, 120-MILLIMETER: AP-T, M358



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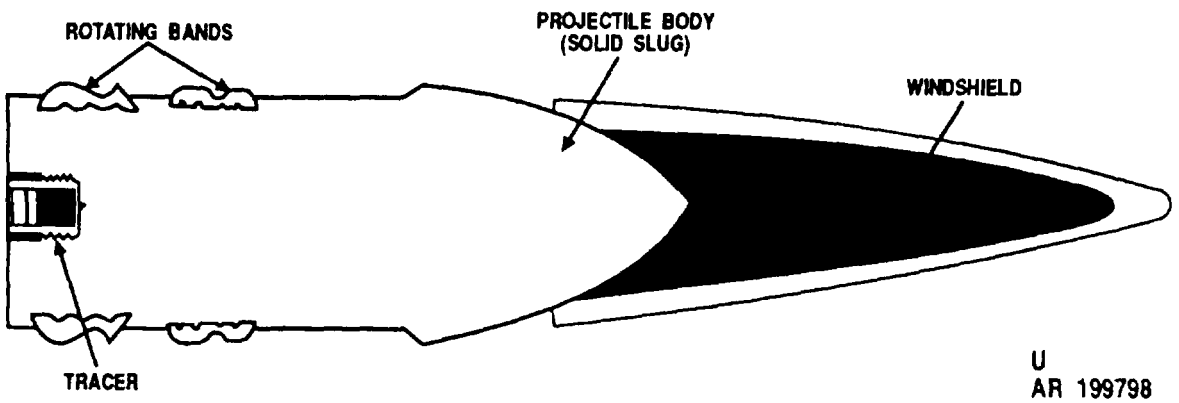

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AR 199798

Type Classification:

Std. OTCM 36841 dtd 1958.

Use:

This armor piercing round has a high velocity projectile designed for use in 120-mm tank guns against armored targets.

Description:

The complete round consists of a steel projectile and a propelling charge assembly. The projectile body is a monobloc slug with a blunt ogive and hardened face. A forged aluminum windshield is attached to the front of the solid projectile body and two separate gilding metal rotating bands are located near the base of the body. A tracer is threaded into the base. The propelling charge assembly consists of a cartridge case, propellant, and a percussion primer.

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Functioning:

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the projectile from the gun bore and ignite the tracer. The tracer provides a visible trace during the first 3 seconds of flight or a range of approximately 3,500 yards, Upon impact, the windshield spreads over the surface of the target, and the hard core projectile body penetrates the target by means of kinetic energy.

Tabulated Data:

Complete round:
- Type ---------- AP-T
- Weight ---------- 50.85 lb
- Length ---------- 17.82 in.
- Cannon used with ---------- M58

Projectile:
- Body material ---------- Steel and aluminum
- Color ---------- Black w/white marking

Components:
- Propelling charge assembly- M46 (T38E1)
- Cartridge case ---------- M109
- Propellant ---------- M17
- Primer ---------- M67
- Tracer ---------- M5 series

Performance:
- Maximum range ---------- 23,683 m (25,290 yd)
- Muzzle velocity ---------- 1,064 mps (3,500 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- Projectile and propelling charge assemhly in separate fiber containers; 2 fiber containers (1 round) per wooden box

*Packing Box:
- Weight ---------- 152.011>
- Dimensions ---------- 41 x 10-27/32 x 15-9/16 in.
- Cube ---------- 3.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0242
DOD hazard class ---------- 1.3
Storage compatibility ---------- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILE
DODAC ---------- 1315 -C802
Drawing number ---------- 7548465

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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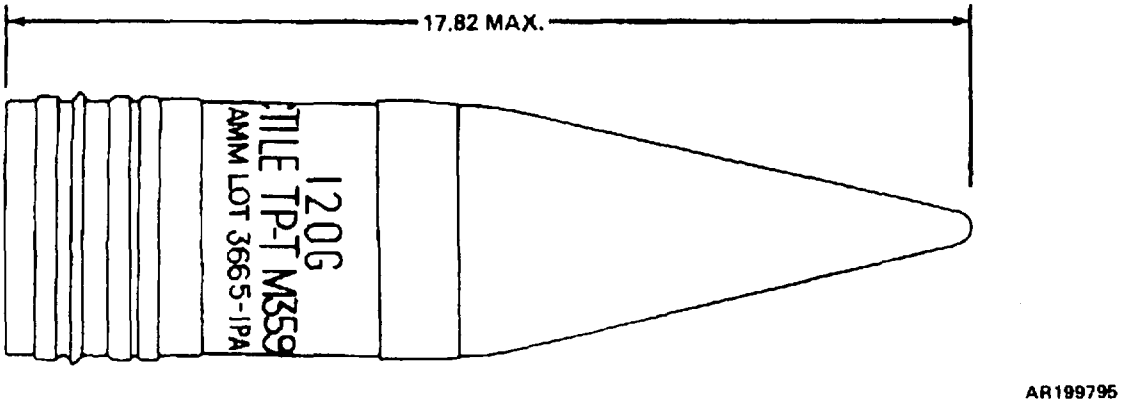
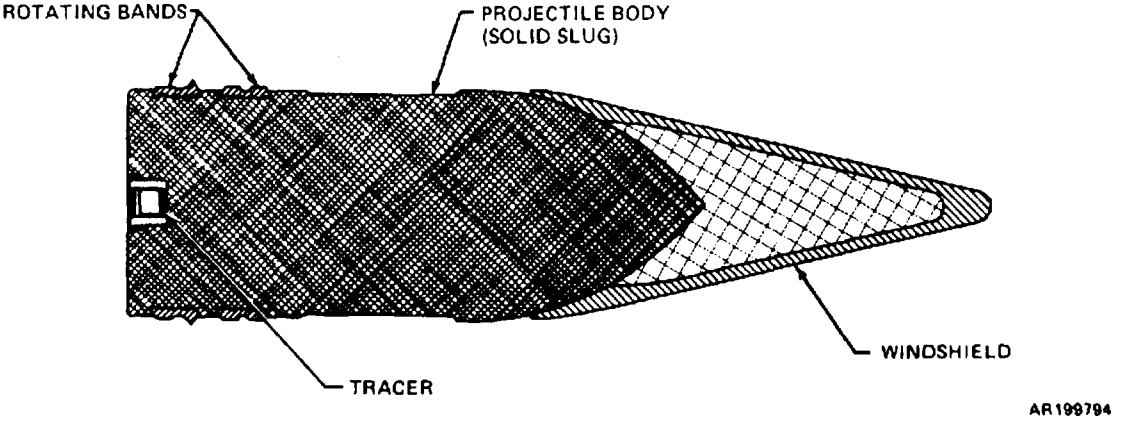
PROJECTILE 1209 MILLIMETERS: TP-T, M359E2 (T14E7)





Type Classificatin:

Std. OTCM 36841 dtd 1958.

Use:

This separated ammunition is a target practice projectile designed for training in marksmanship with 120-mm tank gun cannons.

Description:

The complete round consists of a solid projectile and a propelling charge assembly. The projectile body is a steel monobloc design with a tracer threaded into the base. A streamlined steel nose cone is fitted to the solid slug to improve the ballistic shape. Two gilding metal rotating bands encircle the projectile near the base. The propelling charge assembly is M46, consisting of a cartridge case, propellant, and percussion primer.

Functioning

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propellant ignites the tracer and generates rapidly expand - ing gases to drive the projectile through the br- rel with the velocity required to reach the target. The rotating bands engage the barrel rifling to impart spin to the projectile for stability in flight. The burning tracer provides visibility of the trajectory for a minimum of three seconds. Since the projectile is inert and unfuzed, the only function at the target is the effect of impact.

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Tabulated Data:

Projectile:
- Type ---------- TP-T
- Weight ---------- 50.85 lb
- Length ---------- 17.82 in.
- Cannon used with ---------- M58
- Body material ---------- Low-strength carbon steel
- Color ---------- Blue w/white marking

Components:
- Propelling charge assembly- M46 (T38E1)
- Cartridge case ---------- M109
- Propellant ---------- M17
- Primer ---------- M67
- Tracer ---------- M5 series

Performance:
- Maximum range ---------- 23683 m (25,290 yd)
- Muzzle velocity ---------- l,064 mps (3,500 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- Projectile and propelling charge assembly in separate fiber containers; 2 fiber containers (1 round) per wooden box

*Packing Box:
- Weight ---------- 152.0 lb
- Dimensions ---------- 41 x 10.27/32 x 15-9/16 in.
- Cube ---------- 3.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data inducting NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0242
DOD hazard class ---------- 1.3
Storage compatibility ---------- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILE
DODAC ---------- 1315-C804
Drawing number ---------- 7548465

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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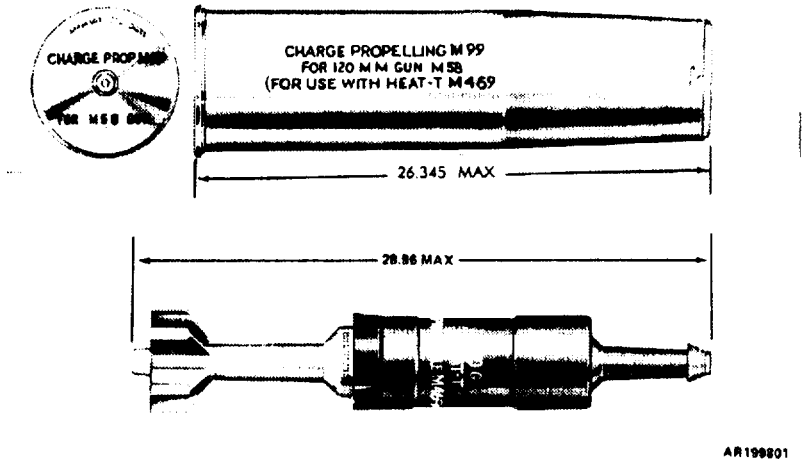
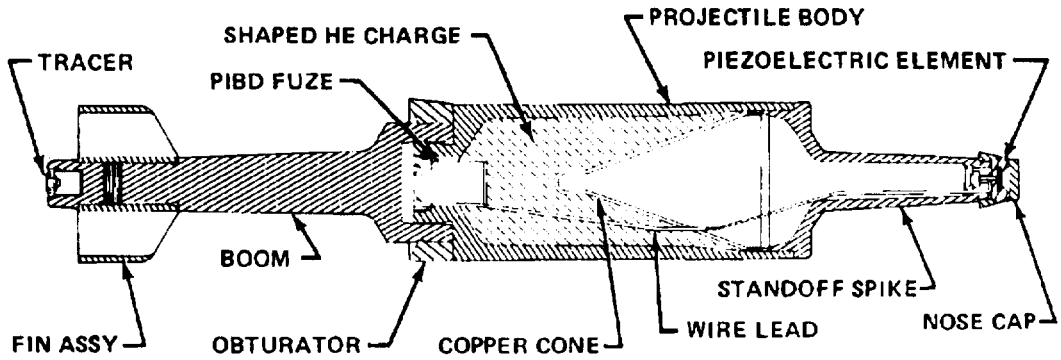
PROJECTILE, 120-MILLIMETER: HEAT-T, M469 (T153E15)





Type Classification:

Std. OTCM 38009 dtd 1962.

Use:

This separated round includes a high velocity projectile designed for use in 120-mm tank guns against armored targets.

Description:

The complete round consists of a projectile and separated cartridge case. The projectile contains a shaped charge, a spike and cone assembly, a fin assembly, and a point initiating, base-detonating fuze. A piezoelectric assembly, contained in the nose spike, acts as a power source for the fuze. Threaded to the projectile base is the boom with a rubber obturator, six fins, and a tracer. A plug and disk assembly in the aft end of the boom hold the tracer. The propelling charge assembly consists of a cartridge case filled with propellant and a primer. The triple-base propellant is packed loose in the cartridge case and held in place with distance wadding. A plastic plug is used to seal the mouth of the cartridge case.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the fin-stabilized projectile from the gun bore and ignite the tracer. The tracer provides a visible and trace for approximately three seconds or to a range of' 3,500 yards. Upon impact, the spike nose is crushed causing the fuze to function. Fuze functioning detonates the high-explosive shaped-charge which collapses the cone assembly and creates a high velocity focused shock wave. The intensity of the shock wave causes failure of the target armor and a jet of metal particles penetrates the interior of the target.

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Tabulated Data:

Projectile w/fuze:
- Type ---------- HEAT-T
- Weight ---------- 31.11 lb
- Length ---------- 28.96 in.
- Cannon used with ---------- M58

Projectile:
- Body material ---------- Steel
- Color ---------- Black w/yellow marking
- Filler and weight ---------- Comp B, 4.51 lb

Components:
- Propelling charge assembly- M99 (T42E1)
- Cartridge case ---------- Mill
- Propellant ---------- M6 (221b)
- Primer ---------- M96, percussion
- Tracer ---------- M13 series
- Fuze ---------- PIBD-M509A1

Performance:
- Maximum range ---------- 23,683 m (25,290 yd)
- Muzzle velocity ---------- 1,140 mps (3,750 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- Projectile and propelling charge assembly in separate fiber containers; 2 fiber containers (1 round) per wooden box

*Packing Box:
- Weight ---------- 115 lb
- Dimensions ---------- 35-1/2 x 10-27/32 x 15-3/16 in.
- Cube ---------- 3.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0006
DOD hazard class ---------- 1.1
Storage compatibility ---------- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C807
Drawing number ---------- 8840529

Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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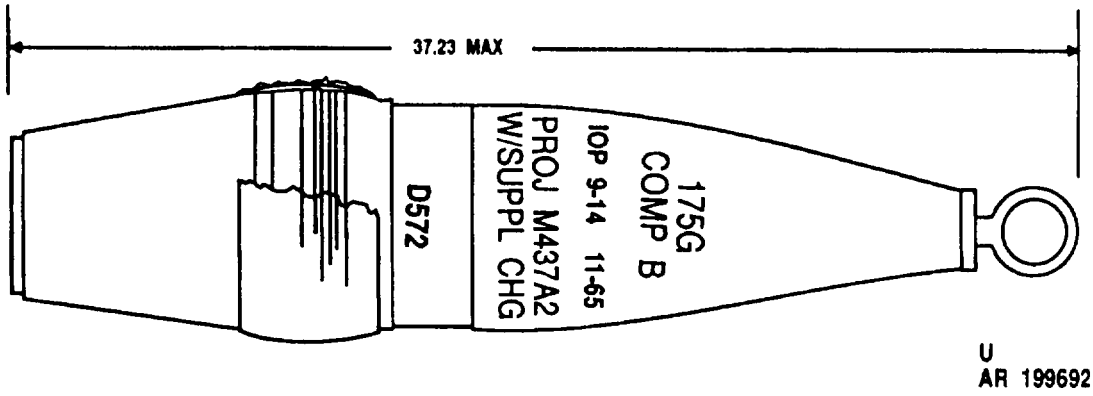
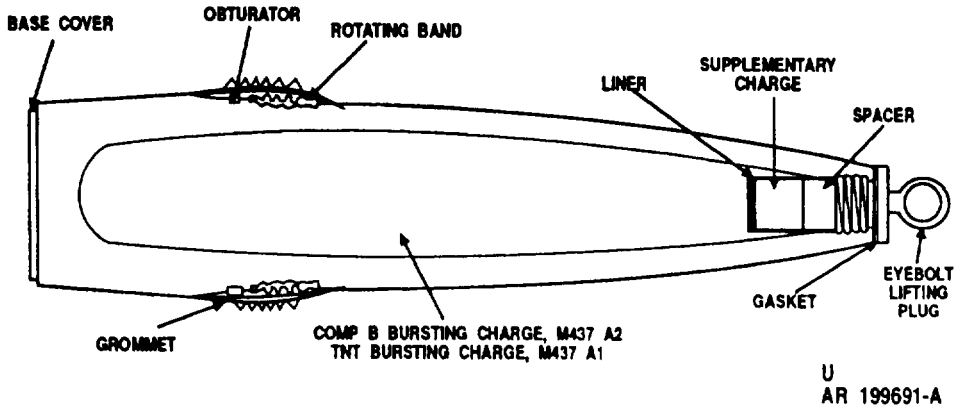
PROJECTILES, 175-MILLIMETER: HE, M437A2 AND M437A1





Type Classification:

M437A2 ------- Std AMCTC 3089 dtd 1965.
M437A1 -------- Std AMCTC 3089 dtd 1965.

Use:

These 175-mm HE Projectiles M437A2 and M437A1 are high explosive rounds for the 175-mm Gun Cannon M113 used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattailed base, a streamlined ogive, a gilding metal rotating band, and a nylon obturating band. A base cover is welded to the base of the projectile for added protection against the entrance of hot gases from the propelling charge during firing. The nose of the projectile is fitted with a threaded eyebolt lifting plug to facilitate handling and provide a closure for the fuze cavity. The projectile is made with a deep fuze cavity and may be loaded with TNT or Composition B. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is zoned into one of four weight zones ranging from 142.75 to 147.23 pounds. The weight zone of the projectile is indicated by the number of prick punch marks on the ogive of the projectile.

Functioning:

When the weapon is fired, Primer M82 ignites the igniter pad of the propelling charge. The burning pad ignites the black powder in the core assembly Sparks and flame flash through perforations in the igniter core tubes in a pattern designed to assure uniform ignition of the propellant increments. Bore wear in the gun is reduced by an additive jacket assembled to Increment 3 when firing at full charge. Gases generated by the burning propellant force the projectile through the gun tube with the velocity required to reach the target. The

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rotating band engages the barrel rifling to impart spin for stabilization in flight. The obturating band expands to prevent leakage of gas pressure past the projectile, and is discarded on leaving the weapon. Depending upon the type fuze employed, the projectile is detonated either on impact or on approach to the target.

Difference Between Models:

Model M437A2 is filled with Comp B. Model M437A1 is filled with TNT.

Tabulated Data:

Projectile:
Type ---------- HE

Weight Zone Information:

WEIGHT ZONE
LOADED PROJECTILE (W/O FUZE)

Zone	Over lb	Up To & Incl	Marking
1	142.75	143.96	⊡
2	143.84	145.05	⊡ ⊡
3	144.93	146.14	⊡ ⊡ ⊡
4	146.02	147.23	⊡ ⊡ ⊡ ⊡

Length:
W/U lifting plug ---------- 34.14 in.
W/lifting plug ---------- 37.23 in. (max)
Cannon (weapon) used with -- M113, M113A1
Body material ---------- Forged steel
Color ---------- Olive drab w/yellow markings
Filler and weight:
M437A2 ---------- Comp B, 31 lb; Supp Chg, 0.30 lb TNT
M437A1 ---------- TNT, 30 lb; Supp Chg, 0.30 lb TNT
Components:
Propelling charge ---------- M86 series
Primer ---------- M82
Fuzes ---------- PD, M572; M739, MTSQ, M582 prox, M728, M732

Temperature Limits:

Firing:
Lower limit ---------- -40°F (-40°C)
Upper limit ---------- +125°F (+52.0°C)
Storage:
Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)
*Packing ---------- 6 projectiles per pallet
*Pallet:
Weight ---------- 948 lb
Dimensions ---------- 42-3/16 x 25-5/8 x 17-1/8 in.
Cube ---------- 10.6 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0168
DOD hazard class ---------- (21) 1.1
Storage compatibility group -- D
DOT shipping class ---------- A
DOT designation ---------- EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D572 (M437A2, M437A1) w/supplementary charge; 1320-D591 (M437A1, M437A2 w/o supplementary charge)
Assembly drawing number --- 8837902

Ballistics: (M113 and M113A1 Cannons)

Charge M86	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)	Chamber Pressure (psi)
*1	1675	16,515	15,100	10,100
2	2310	24,200	22,100	20,200
3	3000	35,800	32,700	45,700

*When firing M86 series Propelling Charge at Zone 1 in a cold weapon, expect the muzzle velocity to exceed the service velocity (1,675 fps) by up to 100 fps resulting in extended range.

References:

AMC-P 700-3-3
TM 9-2300-216-10
TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1300-250

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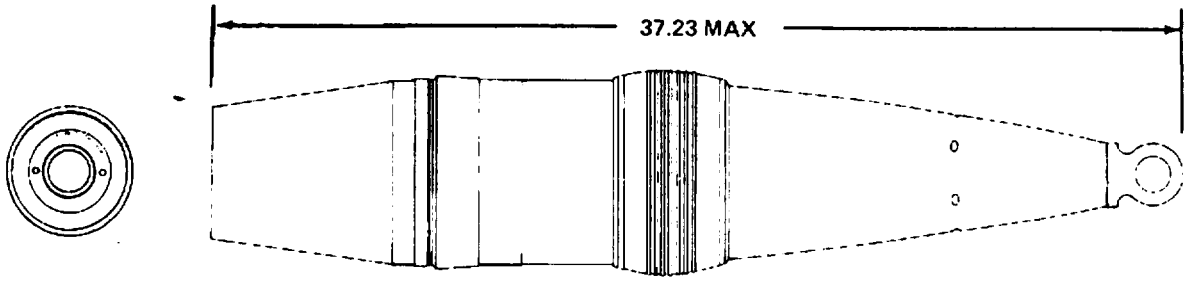
PROJECTILE, 175-MILLIMETER: DUMMY, M458 WITH CHARGE, PROPELLING: DUMMY M98



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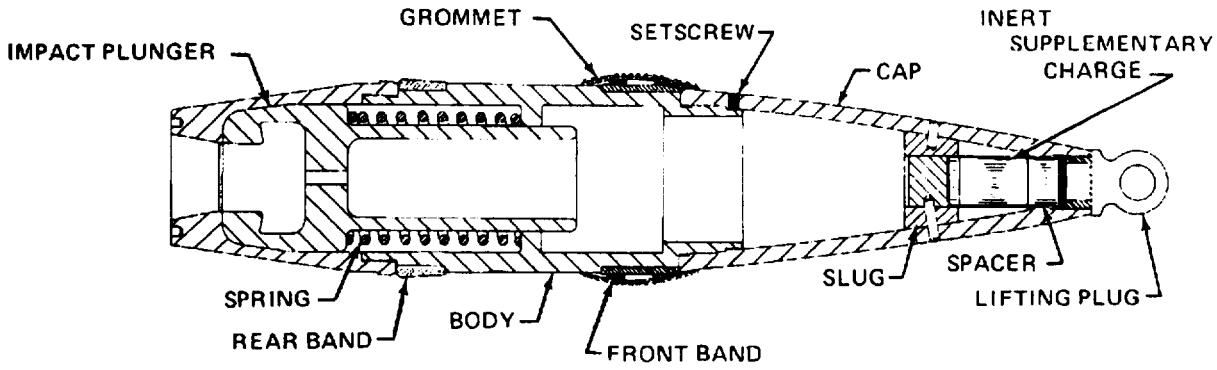

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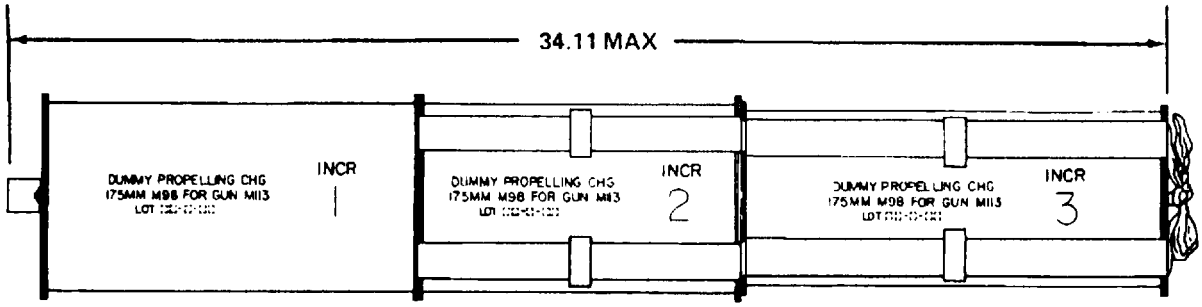

AR199707

Type Classification:

Std AMCTC 2819 dtd 1964.

Use:

Dummy Projectile M458 is used with Dummy Propelling Charge M98. Both components are inert and are used as a drill round to train troops in handling the ammunition and loading the weapon.

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Description:

Dummy Projectile M458 simulates the projectile M437A2 or M437A1 in exterior shape, weight and center of gravity Dummy Propelling Charge M98 likewise simulates service propelling charge M86. The round is employed with Dummy Projectile Extractor M7 for removal of the dummy projectile after ramming, The extractor tool is an 18-foot, 8-inch aluminum pipe fitted with a hook at one end and handles at the other. The base of the dummy projectile contains a lubricated spring-loaded plunger to loosen the projectile in the forcing cone of the barrel after ramming, The projectile exterior is fitted with front and rear bands for engagement with the barrel rifling, and the front band is covered with a protective grommet to be removed before loading. The nose of the projectile has an inert supplementary charge, a spacer, and a threaded lifting plug in the fuze cavity. Dummy Propelling Charge M98 consists of 3 increments filled with wood blocks, weighted with lead to equal the weight of the service charge.

Functioning:

The complete round is inert and does not function. During ramming of the projectile, the internal plunger is driven forward against the plunger spring. On rebound, the plunger impacts the base to loosen the tight fit in the forcing cone which resulted from ramming. The purpose of the mechanism is to ease the extraction of the projectile. Actual extraction is accomplished by manual pulling, using Extractor M7 from the breech of the weapon to engage the base of the projectile.

Tabulated Data:

Type	Dummy
Weight:	
M458	148, 7 lb
M98	57 lb
Length:	
M458 w/lifting plug	37.23 in. max.
M458 w/o lifting plug	34.11 in. max.
M98	49,5 in. max.
Diameter:	
M458 at forward band	6.885 in. max.
M458 at rear band	7,103 in.
M98	8 in. max
Cannon used with	M113, M113A1
Body material	Steel
Material, M98	Lead weighted, fabric covered wooden blocks
Primer	Expended service primer M82
Assembly drawing number:	
M458	11.5656
M98	9205873
Color	Old mfg: black or blue. New mfg: bronze

Temperature Limits:

Not Applicable.

*Packing:	
M458	6 projectiles on pallet
M98	1 dummy charge and expended primer in metal container; 6 containers in wooden box
*Pallet:	
Weight	948 lb
Dimensions	42-3/16 x 25-5/8 x 17-1/8 in.
Cube	10.6 cu ft
*Packing Box:	
Weight	114 lb
Dimensions	55 x 9- 13/16 x 8-7/32 in.
Cube	3.45 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	N/A
DOD hazard class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	AMMUNITION NON-EXPLOSIVE
DODAC:	
M458	1320-D709
M98	1320-D535

Ballistics:

Not Applicable.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2300-216-10

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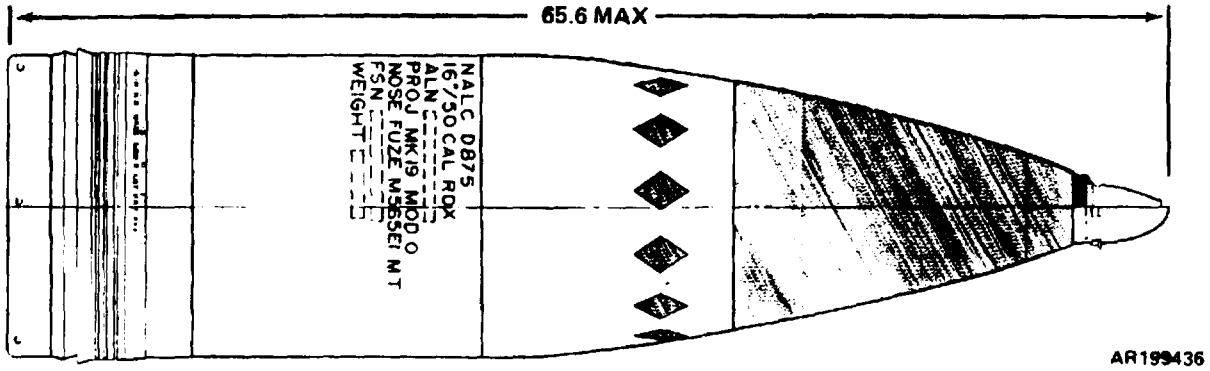
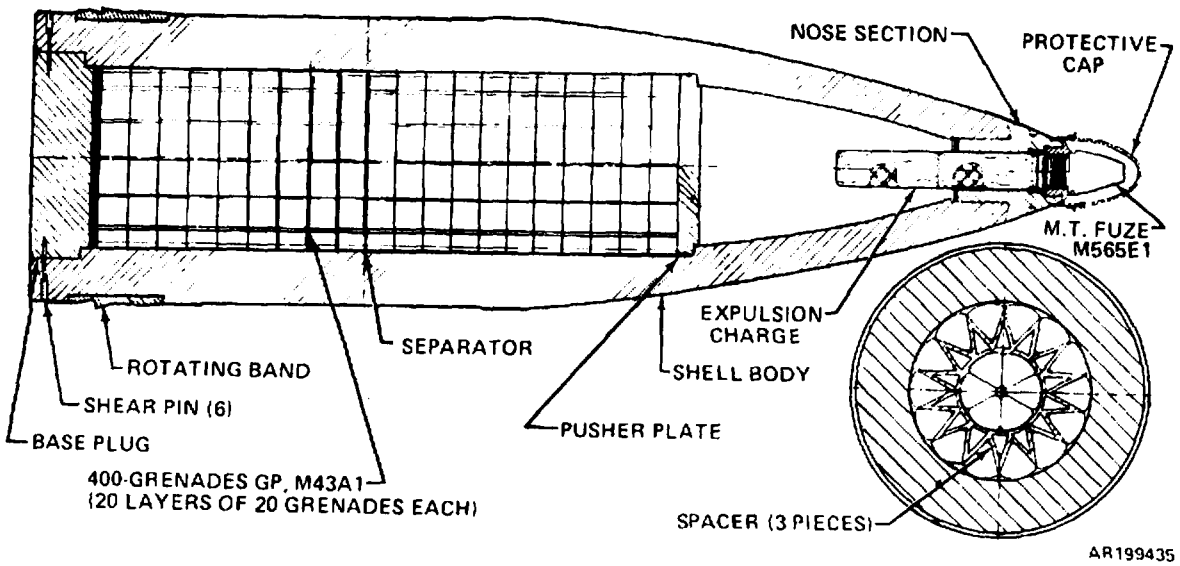
PROJECTILE, 16-INCH: HE, MK19 MOD 0





Type Classification:

Std

Use:

This projectile is for Naval use only. It is designed for use against personnel on the beach or inland, delivering a concentration of grenades at 16-inch gun range.

Description:

This projectile is of the separate loading type. The projectile is shipped to and stored at depot level with a nose protective cap installed. The projectile body is a hollow one-piece steel forging with a streamlined ogive and gilding metal rotating band. The projectile is threaded in the nose to accept an MT fuze and expulsion charge. The expulsion charge consists of 400 grams of M9 mortar propellant. The MT fuze and shims are shipped separately. A base plug is press-fitted and pinned into the rear end of the projectile body. The projectile cavity contains 400 optimum fragmentation M43 grenades, which are held in place by the base plug. The grenades are arranged in 20 layers of 20 grenades each. The grenades are seated in the cavity behind a pusher plate with a separator dividing each layer. The grenades are wedge shaped submissiles, each containing 21.2 grams of explosive Composition A5. With installation of the MT fuze, the projectile is ready to fire utilizing the standard 16-inch propelling charge loaded behind the projectile, and a suitable cannon primer in the breech block of the weapon.

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Functioning:

The cannon primer is initiated, igniting the propelling charge. The expanding propellant gases propel the projectile forward. The rotating band around the projectile engages the rifling m the barrel, imparting spin and obturation to the projectile. The expanding propellant gases force the projectile through the barrel with the velocity required to reach the target area. The fuze timer is initiated when the projectile is fired. After the set time in flight, the fuze functions initiating the expelling charge. The force from the expelling charge detonation pushes the grenade load against the base plug, which shears the pins and ejects the grenades into the air stream. Centrifugal force disperses the grenades radially from the projectile line of flight. When each grenade impacts the target area, an ejection charge functions the grenade 4 to 6 feet above the impact surface. The grenade explodes in an air burst designed to inflict personnel casualties in the target area

Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 1,880 lb
- Length ---------- 65.6 in.
- Cannon used with ---------- Naval Rifle, 16-inch/50

Projectile:
- Body material ---------- Forged steel
- Color---------- Olive drab w/yellow diamonds and yellow markings
- Filler and weight ---------- Explosive Comp A5, 19 lb
- Fuze ---------- MT, M565E1

Propelling charge:
- Type ---------- SPD
- Weight:
  - Service ---------- 660 lb
  - Reduced ---------- 315 lb
  - Primer ---------- Standard, 16-in.

Performance:
- Maximum range ---------- 36,576 m (40,000 yd)
- Muzzle velocity ---------- 822.96 mps (2700 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -29°C (-20°F)
- Upper limit ---------- +54.4°C (+130°F)

Storage:
- Lower limit ---------- -29°C (-20°F)
- Upper limit ---------- + 54.4°C (+130°F)

*Packing:
- Pallet of 2 projectiles --------- MK 3 MOD 0
- Pallet adapter ---------- MK 88 MOD 0

*Pallet:
- Weight (pallet and 2 projectiles) ---------- 4,100 lb
- Dimensions ---------- 69.0 x 41.0 x 26.0 in.
- Cube ---------- 42.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0169
DOD hazard class ---------- (18) 1.2
Storage compatibility group -- D
DOT shipping class ---------- A
DOT designation ---------- EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D875
Drawing number ---------- 9235148

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CHAPTER 3

AMMUNITION FOR HOWITZERS

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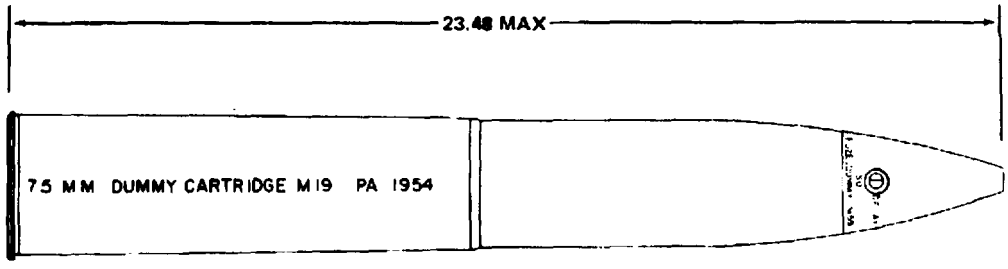
CARTRIDGE, 75-MILLIMETER: DUMMY, M19 OR M19B1



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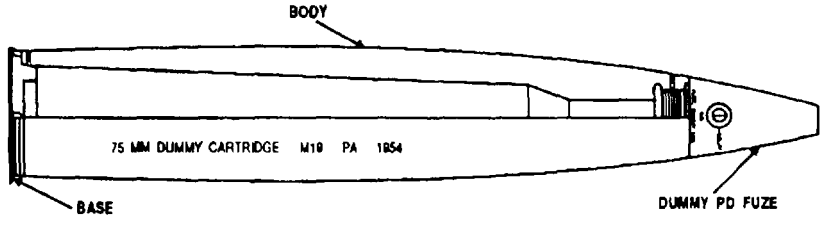

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Type Classification:

Obsolete OTCM 37119 dtd 1959.

Use:

Cartridge M19 or the alternative M19B1 is a dummy cartridge used for training purposes. The cartridge is used with 75-mm pack Howitzer M1A1.

Description:

The Cartridge M19 consists of a malleable iron body simulating a service round with projectile, cartridge case and a steel base; all assembled with a dummy fuze. The alternate dummy Cartridge M19B1 has a bronze body. The cartridge base has a plug simulating a primer. The dummy fuze simulates the weight and contour of a PD service fuze.

Functioning:

The cartridge is inert and nonfunctioning.

Tabulated Data:

Complete round:
- Type ---------- Dummy
- Weight ---------- 18.24 lb
- Length ---------- 23.48 in.
- Cannon used with ---------- M1A1

Projectile:
- Body material:
  - M19---------- Iron
  - M19B1 ---------- Bronze
- Color:
  - Old mfg. ---------- Black or blue w/white markings
  - New mfg. ---------- Bronze w/white markings
- Fuze ---------- Dummy M59

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*Packing ---------- 1 round per fiber container; 2 fiber containers in wooden box

*Packing Box:
Weight ---------- 48 lb
Dimensions ---------- 28-11/16 x 9-11/16 x 6-15/32 in.
Cube ---------- 1.04 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOT desiccation ---------- DRILL CARTRIDGES INERT
DODAC ---------- 1315-C033
Drawing number ---------- 72-3-8

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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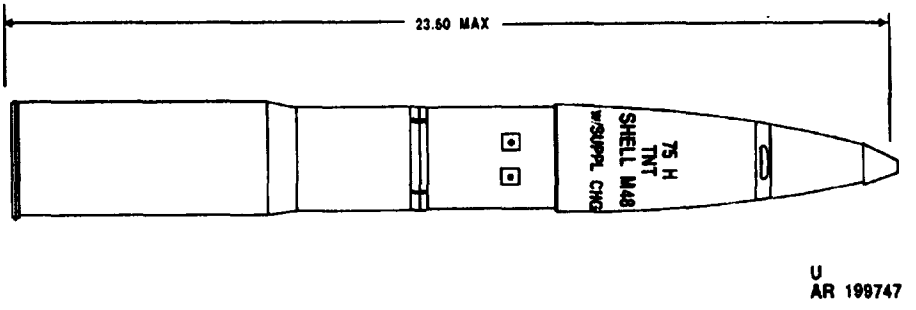
CARTRIDGE, 75-MILLIMETER HE, M48



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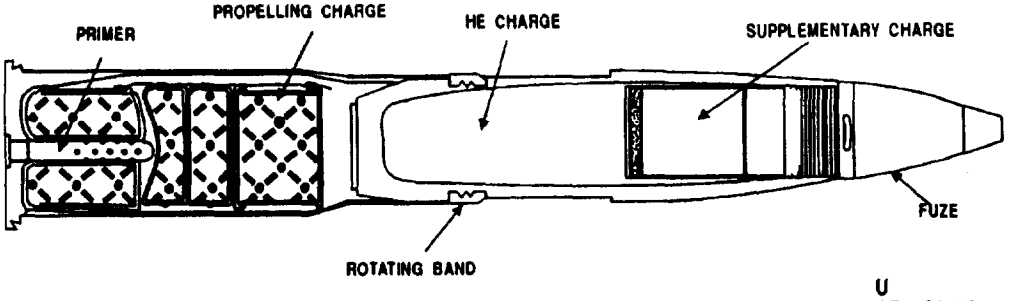

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AR 199746

Type Classification:

OBS MSR 11756003.

Use:

Cartridge M48 is a high explosive type round used for fragmentation, mining, and blast effects. The cartridge is used in 75-mm Howitzer M1A1.

Description:

The projectile of this cartridge is loosely assembled in the cartridge case because of the necessity for removal to adjust the propelling charge. The projectile is made with either a normal or deep fuze cavity. The deep fuze cavity type may be issued with or without a supplementary charge. As issued, the projectile may be fuzed or assembled with a closing plug. Impact, mechanical time-superquick, or proximity fuzes may be used. The propelling charge consists of a four-increment charge (base charge plus three increments) assembled in the cartridge case. A percussion primer is fitted in the base of the cartridge case.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, a small amount of black powder in the primer tube is ignited. Sparks and flame from the black powder ignite the propelling charge. Gases from the burning propelling charge drive the projectile through the bore of the weapon. Spin is imparted to the projectile by the engagement of the rotating band with the rifling in the bore. This spin stabilizes the projectile in flight. When the fuze functions, either over or on the target, the bursting charge detonates with both blast and fragmentation effect.

Tabulated Data:

Complete round:	
Type	HE
Weight	18.24 lb
Length	23.50 in.
Cannon used with	M1A1
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	TNT or 50/50 amatol, 1.49 lb

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Components:	
Cartridge case	M5A1, M5A1B1
Propelling charge	M1
Primer	M1, M1A1, M1A2, M1B1A2 or M64
Fuze:	
PD	M557
PROX.	M513 series
MTSQ	M520 series, M564
Performance:	
Maximum range	8796 meters
Muzzle velocity	1250 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 2 fiber containers per wooden box
*Packing Box:	
Weight	53.0 lb
Dimensions	27-15/16 x 9-5/8 x 6-11/32 in.
Cube	1.01 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	4
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C027 - w/PD fuze, 1315-C028 - w/o fuze
UNO serial number	0321
UNO proper shipping name	Cartridges for weapons
Drawing number	75-1-59

Operational Characteristic

When assembling an impact or mechanical time fuze to a deep cavity projectile, assure that a supplementary charge is installed, as some deep cavity projectiles do not contain a supplementary charge when issued.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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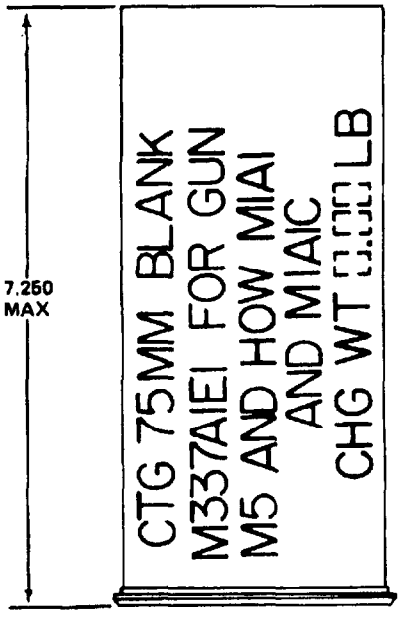
CARTRIDGE, 75-MILLIMETER: BLANK, M337A2 (M337A1E1), M337A1 AND M337



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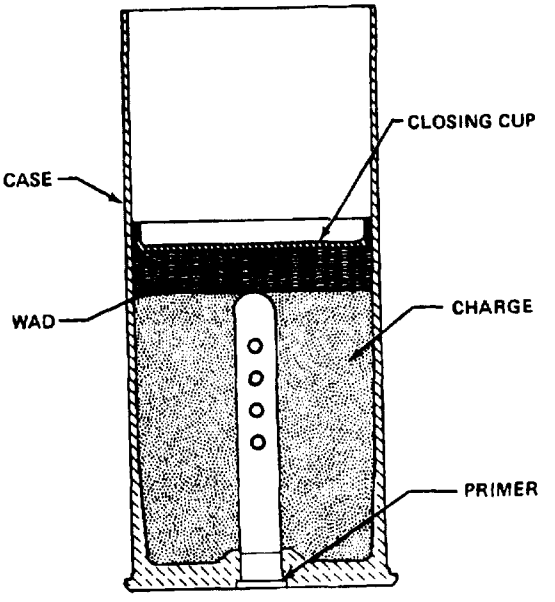

AR199866

Type Classification:

Std AMCTC 4371 dtd 1966 (M337A2) CON MSR 11756003 (M337A1) Std OTCM 36841 dtd 1958 (M337)

Use:

These cartridges are provided for saluting and simulated firing.

Description:

Cartridge M337A2 (M337A1E1) consists of a cartridge case of brass or aluminum containing loosely packed black powder (potassium nitrate) and a press-fitted percussion primer. A fiberglass wad is inserted over the black powder and a polystyrene closing cup is cemented in place with a polyester resin adhesive.

Functioning:

When the firing pin of the weapon strikes the primer, a flash is generated which ignites the black powder charge producing flash, smoke, and a loud report to simulate weapon firing.

Difference Among Models:

Cartridges M337A1 and M337 have brass cartridge cases containing a charge of black powder (sodium nitrate or potassium nitrate) in a cotton bag, and a press-fitted percussion primer. A hair felt wad is inserted over the cotton bag, and a chipboard closing cup is cemented in place with pettman cement.

Tabulated Data:

Complete round:

Type	Blank
Weight	3.25 lb
Length	7. 25 in.
Cannon used with	M116, M120, M1A1, M1A1C, M3

Components:

Body material	Brass or aluminum
Filler and weight	Potassium nitrate or sodium nitrate -1 lb

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Cartridge case	M337A2 (M337A1E1); M9A1, M9A1E1, M337A1, M337; M9A1, M18 (modified)
Primer	M1B1A2

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 15 containers per wooden box
*Packing Box:	
Weight	74 lb
Dimensions	22-13/16 x 13-7/18 x 10- 17/32 in.
Cube	1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	4
Storage compatibility group	E
DOT shipping class	B
DOT description	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC	1315-C025
UNO serial number	0327
UNO proper shipping name	Cartridges for weapons, blank
Drawing number	7549273

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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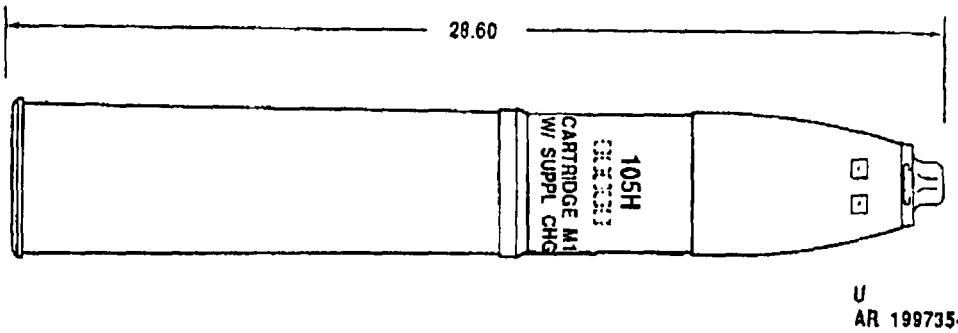
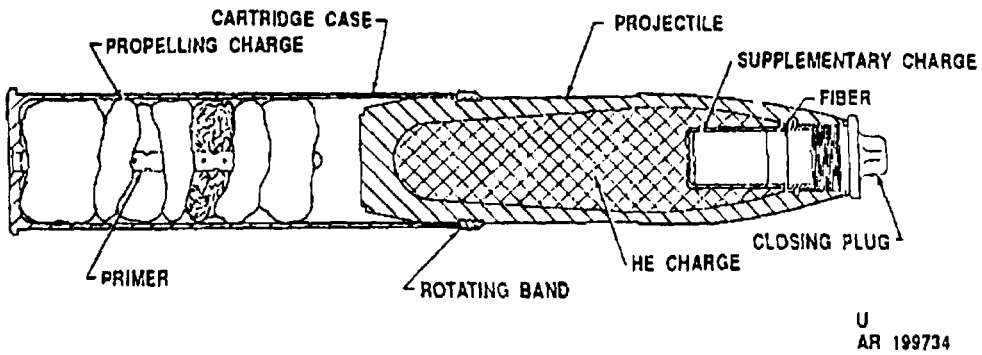
CARTRIDGE, 105-MILLIMETER: HE, M1





Type Classification:

Std AMCTC 4181 dtd 1966.

Use:

The projectile of this cartridge contains high explosive and is used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. A base cover is welded to the base of the projectile for added protection against the entrance of hot gases from the propelling charge during firing. The high explosive (HE) filler within the projectile may be either cast TNT or Composition B. A fuze cavity is either drilled or formed in the filler at the nose end of the projectile. This cavity may be either shallow or deep. A cavity liner, to preclude dusting of HE during transportation and handling, is seated in the cavity and expanded into the lower projectile fuze threads. A supplementary charge is placed in the fuze cavity of projectiles having deep cavities. Projectiles with shallow cavities or deep cavities containing a supplementary charge use only short intrusion fuzes, PD, or MT. Those with deep cavities will accept the long intrusion proximity fuze after removing the supplementary charge. Projectiles may be shipped with a PD or MTSQ fuze or with a closing plug. When shipped with a closing plug, a chip board spacer is assembled between the supplementary charge and plug to limit movement of the former during transportation and handling.

The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

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Functioning:

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing inflight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight or function in proximity with the target area. Fuze function detonates the HE projectile filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 39.92 lb
- Length ---------- W/closing plug 28.60 in. max
- Cannon (weapon) used with ---------- M49 (M52, M52A1), M2A1, M2A2 (M101, M101A1), M103, (M108), M137 (M102)

Projectile:
- Body Material ---------- Forged steel
- Color ---------- Olive drab w/yellow marking

Filler weight:
- Comp B:
  - Normal cavity ---------- 5.08 lb
  - Deep cavity ---------- 4.60 lb
- TNT:
  - Normal cavity ---------- 4.80 lb
  - Deep cavity ---------- 4.25 lb

Weight Zone:

Loaded Shell W/Suppl Charge (without fuze)	Over lb	up to & Incl lb	Zones	Marking
Pounds	29.90	30.60	1	⊡
	30.50	31.20	2	⊡ ⊡
	31.10	31.80	3	⊡ ⊡ ⊡

NOTE: Comp B filled projectiles fall in weight zone 2-1/2 Cartridge Case:

Model	Matl	Wt (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:
- Model----------M67

Components:

Increment No.	Prop Comp & Type	Web Size in. approx	Wt. oz. Approx
1	M1, Type H	0.014	8.6 Single Perf
2	M1, Type II	0.014	1.4 Single Perf
3	M1, Type I	0.026	2.5 Multi Perf
4	M1, Type I	0.026	3.8 Multi Perf
5	M1, Type I	0.026	5.8 Multi Perf
6	M1, Type I	0,026	8.8 Multi Perf
7	M1, Type I	0.026	14.3 Multi Perf

Weight, Total Increments 1-7 ---------- 2.83 lb

Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel. Type 2

Fuzes ---------- PD: M557 M78, Series; M739 Series; MTSQ: M582 Series; M564; prox: M513 series, M728, M732 series, ET: M767

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Performance:
Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

Maximum Range ---------- 11,270 m (12,330 yd)
Muzzle velocity ---------- 472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum range ---------- 11,500 m (12,590 yd)
Muzzle velocity ---------- 494 mps (1621 fps)

Temperature Limits:

Firing:
Lower limit ---------- -40 °F (-40 °C)
Upper limit ---------- +125°F (+52.0°C)

Storage:
Lower limit ---------- -80°F (for periods not exceeding three days) (-62.2°C)
Upper limit ---------- +160°F (for periods not exceeding 4 hr/day (+71.1°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
Weight w/cartridge ---------- 120 lb
Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data

Quantity-distance class ---------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
Drawing number ---------- 9211611 (shipped without fuze
DODAC ---------- 1315-C444, (when cartridge is shipped with either a PD or MTSQ fuze)
DODAC ---------- 1315-C445
UNO serial number ---------- 0321
UNO proper shipping name --- Cartridges for weapons

Limitations:

For proximity mode, VT M513 proximity fuzes are limited to Zones 2 through 6. Zone 7 in combat emergency only. For Impact Action, Zones 4 through 6 only.

VT Fuze M728, for proximity or impact action, Zones 1 through 6. Zone 7 for proximity action only in a combat emergency.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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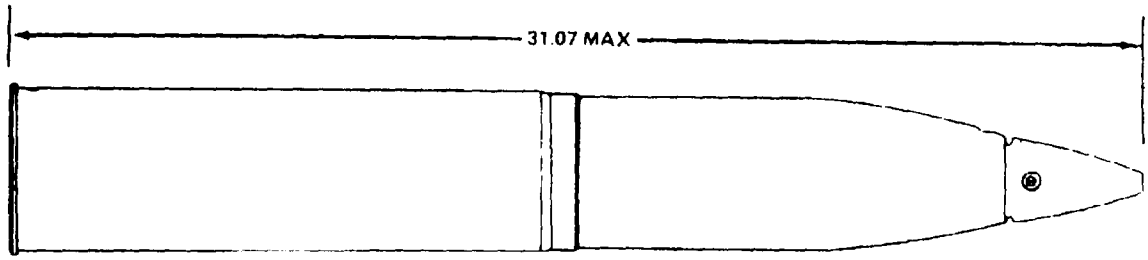
CARTRIDGE, 105-MILLIMETER: DUMMY, M14



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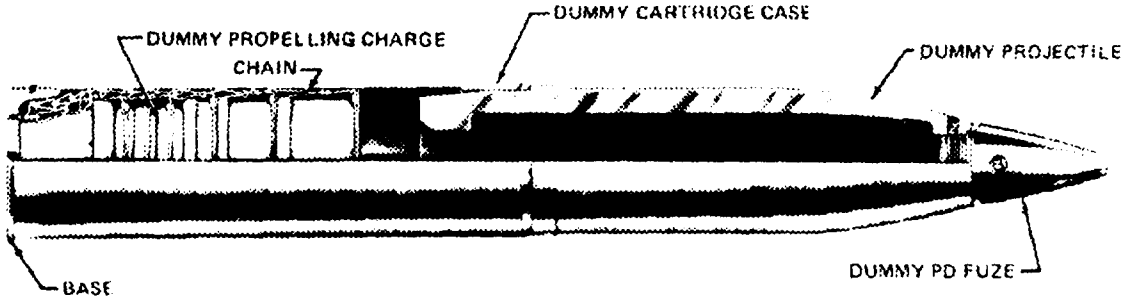

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Type Classification:

Std. OTCM 36841.

Use:

This cartridge is completely inert, and is used for training gun crews in handling and loading 105-mm howitzers.

Description:

The cartridge consists of a hollow dummy projectile loosely seated in a manganese bronze sleeve fitted at the mouth of a dummy cartridge case. The projectile is hollow malleable iron or bronze. A dummy PD fuze is screwed into the internal threading at the nose of the projectile. The projectile has an open base to facilitate extraction from the weapon. The cartridge case is a cadmium plated steel tube with a female thread in the base. A steel or malleable iron base containing an inert primer is threaded into the base of the cartridge case. The cartridge case contains a dummy propelling charge consisting of a base charge and six increments. The base charge is secured by twine or snaps on a sash chain to two eyebolts screwed into the base. The six additional increments are secured to the base charge by twine or snaps on a sash chain.

Functioning:

This dummy cartridge is completely inert and non-functional.

Tabulated Data:

Complete round:

Type	Inert
Weight	42.06 lb
Length w/fuze	31.07 in.
Cannon used with	M2A1, M2A2, M49, M101, M101A, M52, M52A1, M103 (M108), M137 (M102)

Projectile:

Body material	Malleable iron or bronze casting

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Color:
- Old ---------- Black or blue w/white markings
- New---------- Bronze w/white markings

Faze ---------- PD, Dummy M59

Components:
- Cartridge case ---------- M14 series
- Propelling charge ---------- M3, dummy
- Primer ---------- M1B1, inert

Temperature Limits:

None

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 120 lb
- Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
- Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOT designation ---------- DRILL CARTRIDGE INERT
DODAC ---------- 1315-C458
Drawing number ---------- 72-3-78

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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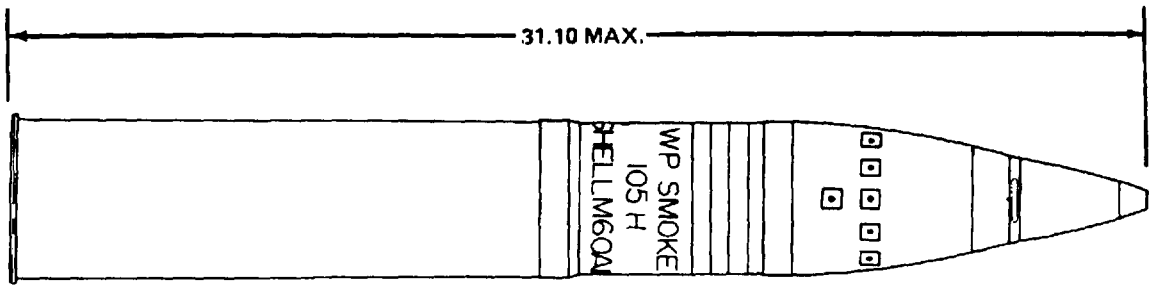
CARTRIDGE, 105-MILLIMETER: SMOKE, WP, M60 SERIES



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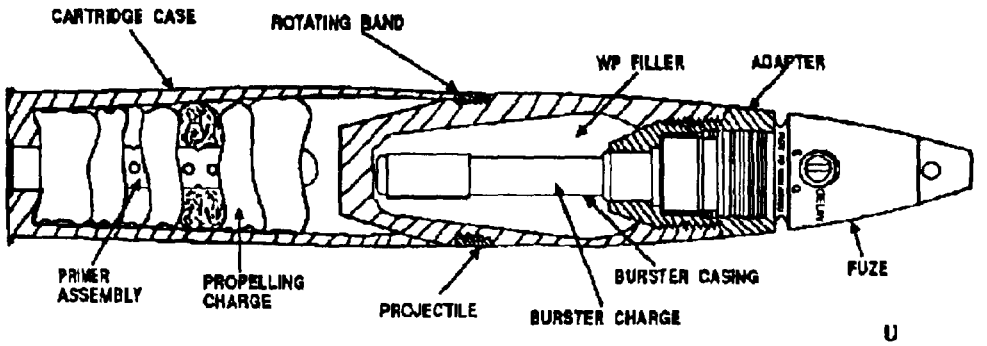

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AR 199720

Type Classification:

Std AMCTC 9102 dtd 1972 (M60A2, M60A1) CON MSR 11756003 (M60).

Use:

The projectile of this cartridge contains white phosphorous (WP) which is dispersed over the target area for screening purposes. The WP also has a limited incendiary effect.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. The projectile cavity is filled with cast WP. A steel nose adapter, having a female fuze thread, with a press fitted burster casing, is threaded into the nose of the projectile providing a seal for the filler. A burster charge is placed inside the burster casing and a fuze is threaded into the adapter. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case around the primer flash tube with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, the closing plug is removed, and a fuze is assembled to the projectile prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile

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rotating band with the rifling of the weapon tube imparts spin to the projectile providing inflight stability. Projectile functioning is dependent upon the fuze used and may function on impact, or function above ground at a predetermined height based upon time of flight. The fuze detonates the burster charge, rupturing the projectile, and dispersing the WP filler. White phosphorous burns on contact with air, producing a dense white cloud of smoke used for ground cover or spotting.

Differences Between Models:

Model	Burster Casing Material	Burster Model No.	Burster Expl Comp	Fuze
M60	Steel	M5	Tetrytol	PD M557
M60A1	High strength aluminum	M53	Comp B	PD M557, MTSQ M564, M582, ET M767
M60A2	High strength aluminum	M53A1 (XM53E1)	Comp B5	PD M557, MTSQ M564, M582, ET M767

Tabulated Data

Complete round:
- Type ---------- Smoke, WP
- Weight ---------- 42.92 lb
- Length ---------- 31.10 in.
- Cannon (weapon) used with ---------- M49 (M52, M52A1), M2A1, M2A2 (101, M101A1, M103 (M108), M137 (M102)

Projectile:
- Body material ----------Forged steel

Color:
- Old mfg---------- Gray w/yellow markings
- New mfg ---------- Light green w/yellow bands and light red markings
- Filler and weight ---------- WP, 3.86 lb

WEIGHT ZONES
Loaded Projectile (w/o fuze or plug)

Zone	Over lb	Up to & Incl lb	Marking
3	31.1	31.8	⊡ ⊡ ⊡
4	31.7	32.4	⊡ ⊡ ⊡ ⊡
5	32.3	33.0	⊡ ⊡ ⊡ ⊡ ⊡
6	32.9	33.8	⊡ ⊡ ⊡ ⊡ ⊡ ⊡

Fuze ---------- PD, M557 or M739

Cartridge case:

Model	Matl	Wt (1b) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:
- Model ---------- M67

Components:

Increment No.	Prop Comp & Type	Web Size in.Approx	Wt oz Approx	Perf Approx
1	M1,Type II	0.014	8.6	Single
2	M1,Type II	0.014	1.4	Single
3	M1,Type I	0.026	2.5	Multi
4	M1,Type I	0.026	3.8	Multi
5	M1,Type I	0.026	5.8	Multi
6	M1,Type I	0.026	8.8	Multi
7	M1,Type I	0.026	14.3	Multi

Weight, Total Increments 1-7---------- 2.83 lb

Percussion Primer Assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	C1 1,Spec MIL-P-223 (Note B)	C1 1,Spec MIL-P-223 (Note B)

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Percussion Primer Assembly: (cont)

	M28A2	M28B2
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

For M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (mps)	(fps)	Maximum Range (m)	(yd)
1	198.1	650	3510	3840
2	216.4	710	4110	4495
3	237.7	780	4860	5315
4	266.7	875	5950	6505
5	310.9	1020	7650	8370
6	376.4	1235	9380	10,260
7	472.4	1550	11,270	12,330

Maximum range ---------- 11,270 m (12,330 yd)
Muzzle velocity ---------- 472 mps (1550 fps)

For M102 and M108 howitzers:

Charge	Muzzle Velocity (mps)	(fps)	Maximum Range (m)	(yd)
1	205	673	3700	4040
2	223	723	4300	4700
3	247	810	5200	5690
4	278	912	6300	6890
5	325	1066	8100	8500
6	393	1289	9600	10,500
7	494	1621	11,500	12,590

Maximum range ---------- 11,500 m (12,590 yd)
Muzzle velocity ---------- 494 mps (1621 fps)

Temperature Limits:

Firing:	M60	M60A1	M60A2(E3)
Lower limit	-40°F	-50°F	-50°F
Upper limit	+125°F	+145°F	+145°F
Storage:			
Lower limit	-65°F	-50°F	-50°F

*Packing ---------- 1 round in fiber container; 2 containers in wooden box
*Packing Box:
Weight ---------- 120 lb
Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/31 in.
Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- (12) 1.2
Storage compatibility group --- H
DOT shipping class ---------- C
DOT designation ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C454
UNO serial number ---------- 0245
UNO proper shipping name --- Ammunition smoke white phosphorus
Drawing number ---------- 9216521

Limitations:

All models: this cartridge should be stored or transported at temperatures below the melting point (+111.4°F) of the WP filler, because of possible cavitation in the filler from melting and resolidification in the projectile cavity. If this is not practicable, the cartridge should be transported or stored with the nose end up to prevent cavitation.

For M60 only: the burster casing in this cartridge contains tetrytol and should not be transported, stored or fired at temperatures exceeding +125°F.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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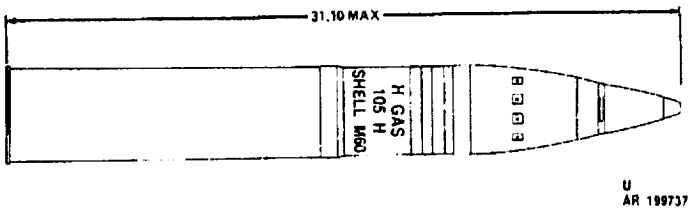
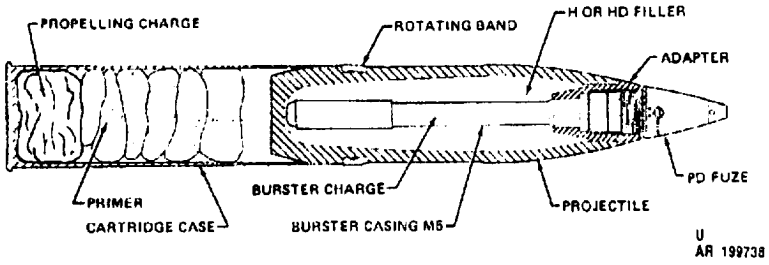
CARTRIDGE, 105-MILLIMETER AGENT, H OR HD, M60





Type Classification:

Std OTCM 36841 dtd 1958.

Use:

The projectile of this cartridge contains a casualty producing agent for use against enemy personnel.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. The projectile cavity is filled with H (mustard) or HD (distilled mustard) in liquid form. A steel nose adapter, having a female fuze thread, with a press fitted burster casing is threaded into the nose of the projectile providing a seal for the filler. A tetrytol burster charge is placed inside the burster casing and a PD fuze threaded into the adapter. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with increment 1 at the base of the cartridge case and increment 7 toward the mouth of the cartridge case.

Functioning:

The propelling charge is adjusted and the cartridge loaded into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which in turn ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing inflight stability. Upon impact with the target, the PD fuze detonates the burster charge rupturing the projectile and dispersing the chemical agent. The liquid agent evaporates forming a persistent gas to envelope the target areas.

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Tabulated Data:

Complete round:

Type	Agent H or HD, persistent
Weight	42.92 lb
Length	31.07 in.
Cannon (weapon) used with	M1A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M137, (M102) and M103 (M108)

Projectile:

Body material	Forged steel
*Color	Gray w/dark green bands (2)
Filler and weight	3.17 lb H, or 2.97 lb HD
Fuze	PD M557, M739, M51A5,

WEIGHT ZONES
LOADED SHELL W/BURSTER CHARGE
W/O FUZE

Zone	Over lb	Up to & Incl lb	Marking
2	30.5	31.2	▫• ▫•
3	31.1	31.8	▫• ▫• ▫•
4	31.7	32.4	▫• ▫• ▫• ▫•

Propelling charge:

Cartridge case	M14 series
Propellant	M67, 2.825 lb
Primer	M28A2, or M28B2

Performance:

For M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (mps)	Velocity (fps)	Maximum (m)	Range and (yd)	Elevation (mil)	Angle (deg)
1	198.1	650	3,510	3,840	782	44.0
2	216.4	710	4,110	4,495	780	43.9
3	237.7	780	4,860	5,315	774	43.6
4	266.7	875	5,950	6,505	784	44.1
5	310.9	1,020	7,650	8,370	771	43.4
6	376.4	1,235	9,380	10,260	779	43.8
7	472.4	1,550	11,270	12,330	783	44.0

Maximum Range	11,270 m (12,330 yd)
Muzzle velocity	472.4 mps (1550 fps)

For M102 and M108 howitzers:

Charge	Muzzle (mps)	Velocity (fps)	Maximum (m)	Range and (yd)	Elevation (mil)	Angle (deg)
1	205	673	3,700	4,040	689.6	38.7
2	223	732	4,300	4,700	694.1	39.0
3	247	810	5,200	5,690	742.7	41.7
4	278	912	6,300	6,890	687.2	38.6
5	325	1,066	8,100	8,500	702.0	39.5
6	393	1,289	9,600	10,500	734.2	41.3
7	494	1,621	11,500	12,590	728.4	40.9

Maximum range	11,500 m (12,590 yd)
Muzzle velocity	494 mps (1621 fps)

*NOTE: Renovated or newly manufactured projectiles will be marked with one colored dark green band and, if burstered, one yellow band.

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
**Packing	1 round in fiber container, 2 containers in wooden box

**Packing Box:

Weight	120 lb
Dimensions	37-1/4 x 11-15/16 x 7-19/32 in.
Cube	2 cu ft

**Note: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) 1.2
Storage compatibility group	K
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH GAS PROJECTILES
DODAC	1315-C442
UNO serial number	0020
UNO proper shipping name	Ammunition, toxic
Drawing Number	75-1-109

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Limitations:

The burster in this ammunition is loaded with tetrytol and may not be stored or fired at temperatures exceeding + 125°F.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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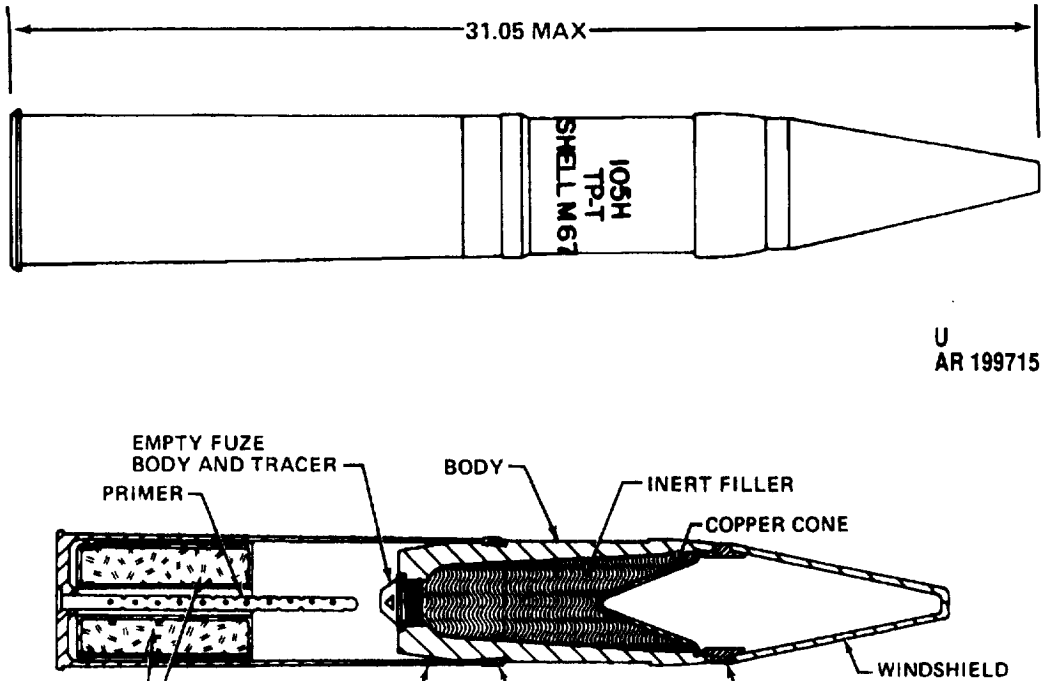
CARTRIDGE, 105-MILLIMETER TP-T, M67



Type Classification:

CONT AMCTC 8650, dtd 1971.

Use:

This cartridge is used for training in marksmanship.

Description.

The projectile consists of a boattailed steel body fitted with a steel windshield and gilding metal rotating band, The windshield is a hollow steel cone fitted to the front of a steel adapter. The adapter is threaded into the front end of the projectile, and retains a copper conical liner in the projectile cavity. The projectile cavity contains an inert filler instead of a shaped HE charge as in the service projectile. An empty fuze body with a live tracer is threaded into the base of the projectile. The complete projectile assembly is a free fit in the cartridge case. The cartridge case contains a percussion primer assembly and a single propelling charge increment. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The single increment bag is assembled into the cartridge case around the primer assembly.

Functioning:

The weapon firing pin strikes the percussion primer which ignites the black powder in the primer. The primer ignites the propelling charge uniformly through the perforations in the primer tube and also ignites the tracer. The rotating metal band around the projectile engages the rifling in the barrel to impart spin to the projectile for in-flight stablilty. The expanding gases from the propelling charge force the projectile through the barrel with the velocity required to reach the target. The tracer burns for a minimum of 3 seconds during projectile flight. The projectile is non-functional, because it is an inert practice round lacking the penetrating capability of a service round.

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Tabulated Data:

Complete round:	
Type	TP
Weight	37.06 lb
Length	31.05 in.
Cannon (weapon) used with	M49 (M52, M52A1), M2A1, M2A2 (M101, M101A1), M103 (M108), M137 (M102)
Projectile:	
Body material	Steel bar
Color	Blue or black w/white markings
Filler and weight	Inert filler, 3.89 lb
Tracer	M5A2B1
Propelling charge:	
Cartridge case	M14 Series
M14	Brass, 5.9 lb (approx)
M14B4	Steel, 3 pc spiral wrap, 4.7 lb (approx)
Propelling charge	M1, 1.54 lb
Primer	M28A2, M28B2
Performance:	
Maximum range	8281 yd
Muzzle velocity	1250 fps

Temperature Limts:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (for periods not exceeding 3 days) (-62.2°C)
Upper limit	+160°F (for periods not exceeding 4 hr/day) (+71.1°C)
*Packing	1 round in fiber container; 2 containers in wooden box
*Packing Box:	
Weight	120 lb
Dimensions	37-1/4 x 11-15/16 x 7-19/32 in.
Cube	2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH INERT-LOADED PROJECTILES
DODAC	1315-C457
UNO serial number	0328
UNO proper shipping name	Cartridges for weapons, inert projectile
Drawing number	75-1-491/75-1-191

References:

AMC-P 700-3-3
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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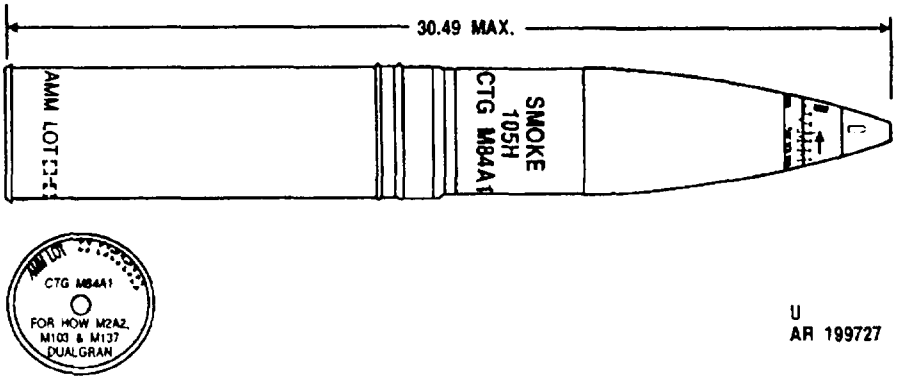
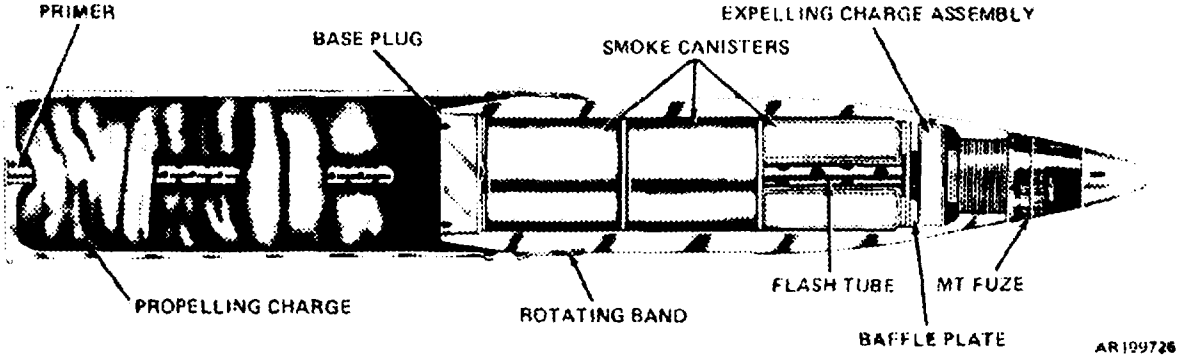
CARTRIDGE, 105-MILLIMETER: SMOKE HC, BE, M84 SERIES





Type Classification:

Std AMCTC 7621, dtd 1970 (M84A1, M84B1) CON MSR 11756003 (Red, Green, and Yellow Colored Smoke).

Use:

The projectile of this cartridge contains a smoke mixture which, when ignited and ejected, serves as a signal, a screen, or to spot a target.

Description:

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, gilding metal rotating band, and base plug. A black powder expelling charge is assembled into the projectile at the nose end. Next, a steel baffle (pusher) plate, with a central hole, is assembled behind the expelling charge followed by three smoke canisters, alternating spacers, fillers, and the base plug. The spacers are assembled between canisters, as well as at the base, to insure a tight canister pack. An MTSQ or MT fuze is assembled to the nose of the projectile. The canisters are metal cylinders with a central igniter core. Around the igniter core is a first-fire mix which serves to initiate the smoke mix. The smoke mix surrounds the first-fire mix and when initiated, generates a white (HC) or, in the cases of the M84 and M84B1, HC or other colored smoke. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is press fitted in the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

Adjust the propelling charge, if required, prior to loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expan-

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sion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. The projectile functions above ground at a predetermined height based upon time of flight. The fuze initiates the black powder in the expelling charge which flashes through the center hole of the baffle plate initiating the first-fire mix in the canisters. The burning black powder generates gas pressure against the baffle plate which, through the canisters, causes the base plate and canisters to leave the projectile. The first-fire mix initiates the smoke charge. The canisters burn for 40 to 90 seconds.

Difference Between Models:

	M84	M84B1	M84A1
Body forging	Transom below Fuze Thd	Transom below Fuze Thd	No transom
Expelling charge	BP in cloth bag	BP plastic cup encased	BP in plastic cylinder
Nose Thd	1.7 x 14 TPI	1.7x 14 TPI	2 x 12 TPI
Fuze	MTSQ M501 M501A1	MTSQ M501 M501A1	MTSQ, M577, M548; MT, M565; ET, M762
Spacers	Chipboard	Chipboard	Aluminum
Filler	Chipboard	Chipboard	Felt
Colors available	HC, red, yellow, green	HC, red, yellow, green	HC, red, yellow, green

Tabulated Data:

Complete round:
- Type ---------- Smoke, HC
- Weight ---------- 41.96 lb
- Length ---------- 30.49 in.
- Cannon used with ---------- M2A2, M103 or M137

Projectile:
- Body material ---------- Steel forging
- Color ---------- Light green w/black markings
- Filler and weight ---------- HC 12.3 lb

Components:
- Cartridge case ---------- M14B4 (3 pc spiral steel) or M14B1 (drawn steel)
- Propelling charge ---------- M67, 2.83 lb

Chg Wt in Oz Approx	Type	Web Approx
8.6	II	0.014
1.4	II	0.014
22.5	I	0.026
3.8	I	0.026
5.8	I	0.026
8.8	I	0.026
14.3	I	0.026

- Primer ---------- M28B2, M28A2

Performance:
Using M52, M52A1 and M101/M101Al howitzers:

Charge	Muzzle Velocity (fps)	(reps)	Maximum range	(yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

- Maximum range ---------- 11,270 m (12,330 yd)
- Muzzle velocity ---------- 472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

- Maximum range ---------- 11,500 m (12,590 yd)
- Muzzle velocity ---------- 494 mps (1621 fps)

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Temperature Limits:

Firing:	
Lower limit	-65°F (-54°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-65°F (-54°C)
Upper limit	+145°F (+63°C)
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing Box:	
Weight	120 lb
Dimensions	37-1/4 x 11-15/16 x 7-19/32 in.

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) 1.2
Storage compatibility group	G
DOT shipping class	E
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
**DODAC:	
HC	1315-C452
Red	1315-C453
Yellow	1315-C455
Green	1315-C452
UNO serial number	0015
UNO proper shipping name	Ammunition, smoke
Drawing number	9223421-1

**NOTE: Some M84A1 are issued w/o fuse (DODAC - 1315-C479)

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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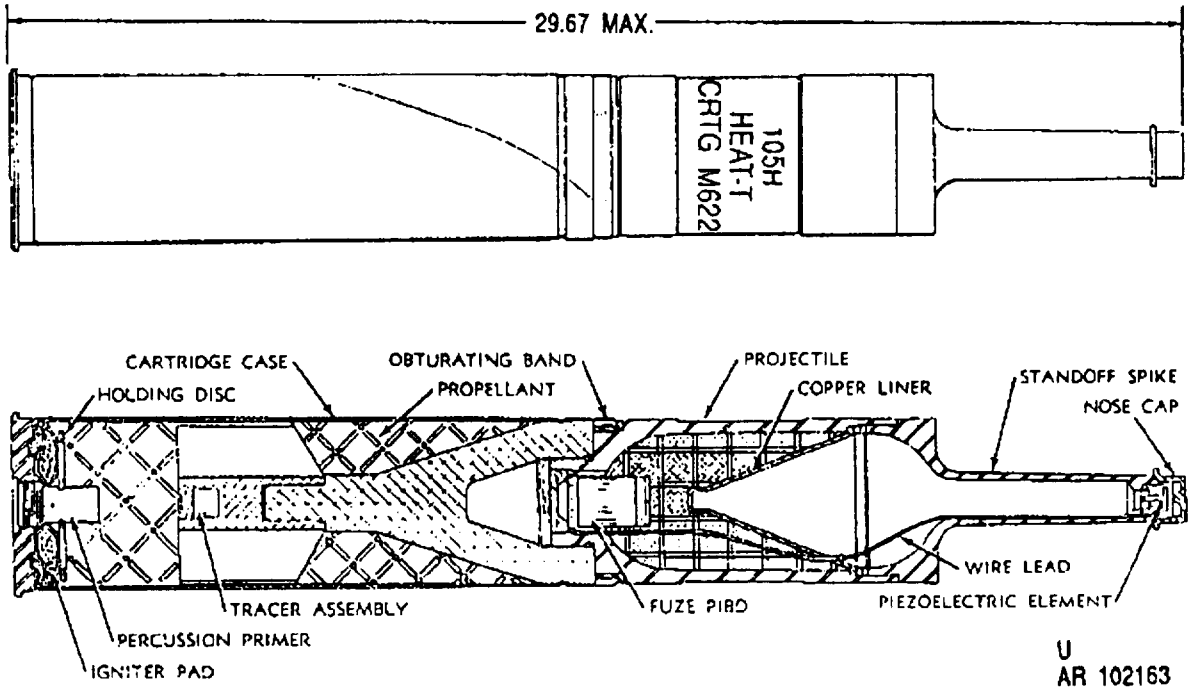
CARTRIDGE, 105-MILLIMETER: HEAT-T, M662



Type Classification:

Std-MSR 06786019.

Use:

This cartridge is a fixed high-explosive antitank round for utilization with 105mm howitzers for an expanded capability in a direct-fire mode against armor and hard targets.

Description:

The projectile configuration is that of a steel body cylinder having a plastic obturating band and M509A1 point initiating base detonating (PIBD) fuze with a standoff spike assembly threaded to the front and a tin and boom assembly threaded to the rear. The loading of the projectile consists of a Comp B shaped charge formed by a funnel-shaped copper liner within the body A piezoelectric element is fitted to the spike assembly and connected to the M509A1 PIBD fuze in the body. The fin assembly is threaded to receive an M13 tracer assembly. The cartridge is of the fixed type, i.e., the M201 cartridge case is crimped to the projectile and requires a minimum bullet pull of 3,000 pounds.

The cartridge case is of the two-piece spiral design and contains an M1OO MOD percussion primer, an igniter pad and 57 ounces of M30 propellant.

Functioning:

Impact of the weapon firing pin ignites the percussion primer resulting in ignition of the igniter pad and M30 propellant producing a rapid expansion of propellant gas which propels the projectile out of the weapon tube. The projectile is tin stabilized in flight with only a minimal spin imparted to the projectile when the plastic obturator engages the weapon tube rifling. The hot propellant gases also ignite the tracer which burns for a minimum of 2.5 sec and provides visual observance of the projectile trajectory. On impact, fuze functioning detonates the explosive filler, causing collapse and inversion of the copper cone, creating a high velocity focused shock wave and jet of metal particles with which to penetrate the target.

Tabulated Data:

Complete round:

Type	HEAT-T
Weight	32.1 lb
Length	29.67 in.
Cannon used with	M2A1, M2A2,

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Projectile:
- Body material ---------- Steel bar
- Color ---------- Black w/yellow markings
- Filler ---------- Comp B
- Weight of filler ---------- 2.14 lb

Components:
- Cartridge case ---------- M201
- Propellant ---------- M30 (57 oz)
- Primer ---------- M100 Mod
- Tracer ---------- M13
- Fuze ---------- PIBD M509A1

Performance:
- Maximum range ---------- classified
- Muzzle velocity ---------- classified

Temperature Limits:

Firing:
- Lower limit ---------- -45ºF (-41.8ºC)
- Upper limit ---------- 45°F (+62.8°C)

Storage:
- Lower limit ---------- -80ºF (62.2ºC) (for periods not exceeding 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for periods not exceeding 4 hr/day)

*Packing ---------- 1 round per fiber container 2 fiber containers per wooden box

*Packing Box:
- Weight ---------- 110 lb
- Dimensions ---------- 38-1/8 x 12 x 7-21/32 in.
- Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C472
Drawing number ---------- 9282517

References:

AMC-P 700-3-3

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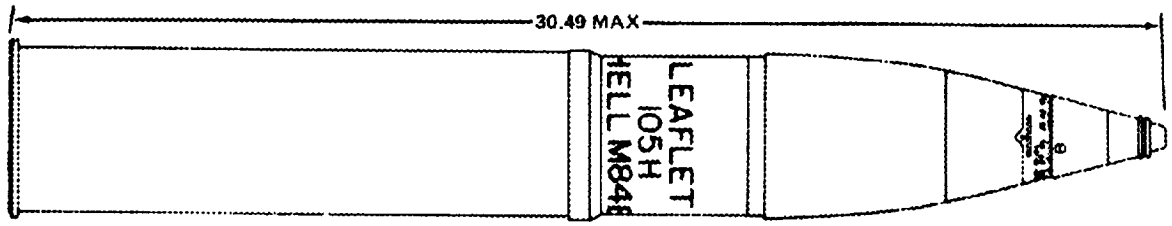
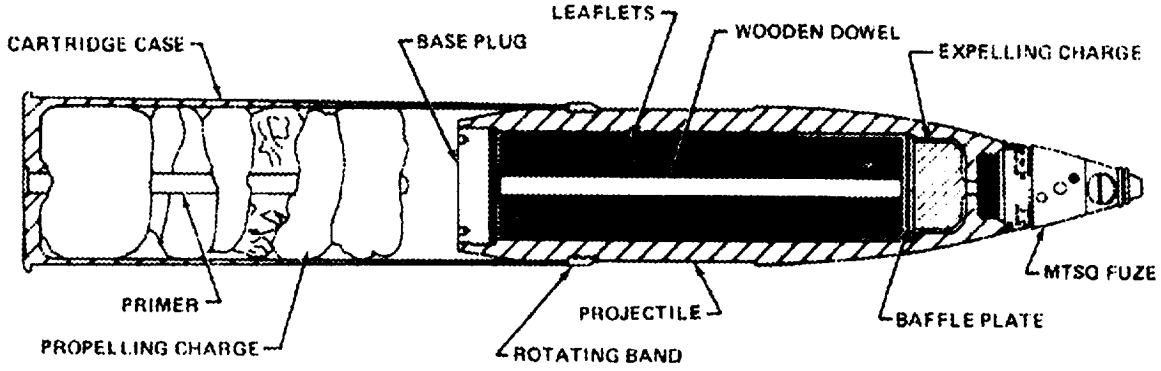
CARTRIDGE, 105-MILLIMETER: LEAFLET, M84B1



AR199705



AR199706

Type Classification

OBS MSR 11756003.

Use:

The projectile of this cartridge is filled with printed instructional or propaganda material in the form of leaflets for distribution to enemy troops and for civilians.

Description

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, gilding metal rotating band, and steel base lug threaded into the base of the projectile. A plastic encased black powder expelling charge is assembled to the projectile at the nose end. Next, a steel baffle plate is assembled behind the expelling charge followed by a 3/4-inch diameter wooden dowel, spacers, and the base plug. The leaflets are furnished later, to meet the mission requirements, and assembled in the projectile around the wooden dowel just prior to firing,

The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case around the primer flash tube with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

Adjust the propelling charge, if required, prior to loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. The projectile func-

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tions above ground at a predetermined height based upon time of flight. The fuze ignites the black powder in the expelling charge which, in turn, through gas pressure on the baffle plate and through the dowel causes the base plate to separate from the projectile. The baffle plate pushes the leaflets out of the projectile, and the air stream and projectile spin disseminate the leaflets over the target area.

Tabulated Data:

Complete round:
- Type ---------- Leaflet
- Weight ---------- 39.7 lb
- Length ---------- 30.49 in.
- Cannon (weapon) used with ---------- M2A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M103 (M108), M137 (M102)

Projectile:
- Body material ---------- Forged steel
- Color ----------
- Filler ---------- Leaflets
- Fuze ---------- MTSQ, M501 or M501A1

Propelling charge:
- Cartridge case ---------- M14B1, M14B4

Propelling charge:
- Model ---------- M67

Components:

Increment No.	Prop Comp & Type	Web size in. approx	Wt oz approx	Perf
1	M1, Type II	0.014	8.6	Single
2	M1, Type II	0.014	1.4	Single
3	M1, Type I	0.026	2.5	Multi
4	M1, Type I	0.026	3.8	Multi
5	M1, Type I	0.026	5.8	Multi
6	M1, Type I	0.026	8.8	Multi
7	M1, Type I	0.026	14.3	Multi

Weight, Total Increments 1-7 2.83 lb
- Primer ---------- M28A2, M28B2

Performance:
- Maximum range ---------- 9943 yd
- Muzzle velocity ---------- 1422 fps

Temperature Limits:

Firing:
- Lower limit ---------- -65°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -65°F
- Upper limit ---------- +125°F

*Packing ---------- 1 round in fiber container; 2 rounds in wooden box

*Packing Box:
- Weight ---------- 120 lb
- Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
- Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- (08) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C450
UNO serial number ---------- 0321
UNO proper shipping name --- Cartridges for weapons
Drawing number ---------- 9219187

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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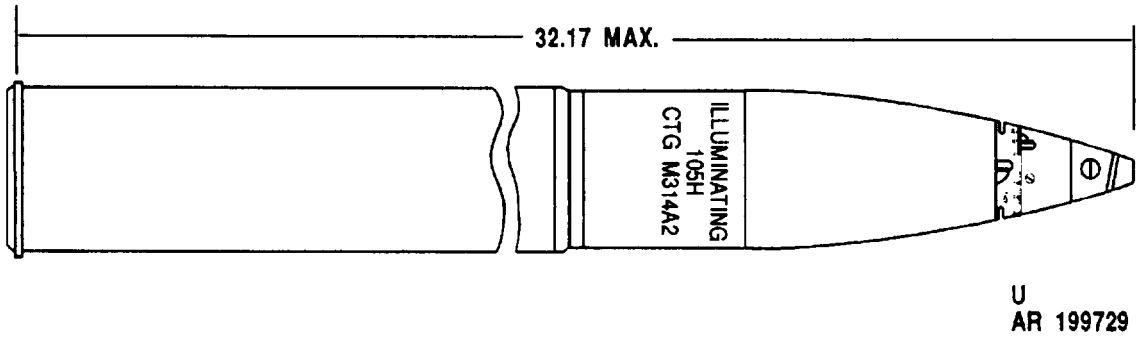
CARTRIDGE, 105-MILLIMETER ILLUMINATING, M314, M314A2, M314A2B1



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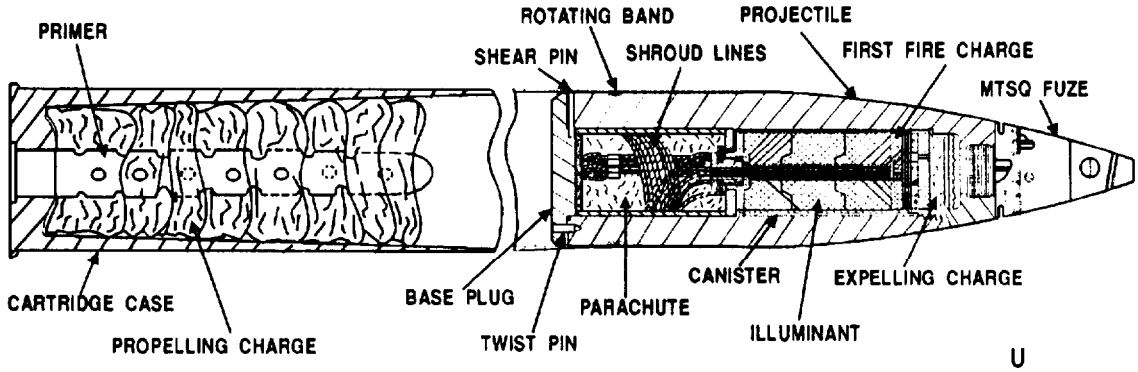

U
AR 199728

Type Classification:

C & T AMCTC 7467, dtd 1970.

Use:

This cartridge is intended for illuminating a designated target area.

Description:

The projectile is a hollow steel forging with a streamlined ogive, gilding metal rotating band, and pinned base plug. The projectile is assembled with an MTSQ fuze threaded into the nose of the projectile. The projectile cavity contains the expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.11 lb of black powder contained in a cloth bag. The illuminating canister contains the illuminant and 0.15 lb of first-fire composition. The parachute assembly is attached to the illuminating canister body. The base plug is inserted into the opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile is free-fitted to a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increments bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, both the closing plug and the fuze assembly to the projectile are removed prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon

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tube imparts spin to the projectile providing in-flight stability. The MTSQ fuze functions and ignites the expelling charge, and in turn, ignites the first-fire composition. The expelling charge ejects the illumination canister and parachute assembly from the base of the projectile by blowing off the base plug. Concurrently, the parachute deploys and inflates, and the illuminant is ignited by the first-fire composition. Average luminosity is 450,000 candlepower with a burning time of 60 seconds.

Tabulated Data:

Complete round:
- Type ---------- Illuminating
- Weight ---------- 46.43 lb
- Length ---------- 32.17 in.
- Cannon (weapon) used with ---------- M49 , (M52, M52A1), M2A1, M2A2 (M101, M101A1), M103 (M108), M137 (M102)

Projectile:
- Body material ---------- Forged steel
- Color ---------- Gray w/white band and white markings (Later manufacture - white w/black markings)
- Filler and weight ---------- Illum, 1.74 lb
- Fuze ---------- MTSQ, M501, M501A1

Propelling charge:
- Cartridge Case ---------- M14 series
- Propellant ---------- M67, 2.8 lb
- Primer ---------- M28A2, M28B2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

- Maximum Range ---------- 11,270 m (12,330 yd)
- Muzzle velocity ---------- 472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

- Maximum Range ---------- 11,500 m (12,590 yd)
- Muzzle velocity ---------- 494 mps (1621 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -80°F (for periods not exceeding 3 days) (-63°C)
- Upper limit ---------- +160°F (for periods not exceeding 4 hr/day) (+71.1°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 120 lb
- Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
- Cube ---------- 2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- Storage class/SCG ---------- (08) 1.2 G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1315-C449
- UNO serial number ---------- 0171
- UNO proper shipping name --- Ammunition, illuminating
- Drawing number ---------- 75-1-229

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Limitations:

The M501/M501Al fuze is not dropsafe. Dropping or rough handling of a projectile assembled with fuze MTSQ M501/M501A1 can and has resulted in fuze functioning and expulsion of projectile base plate and contents.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20
TM 9-1300-251-34

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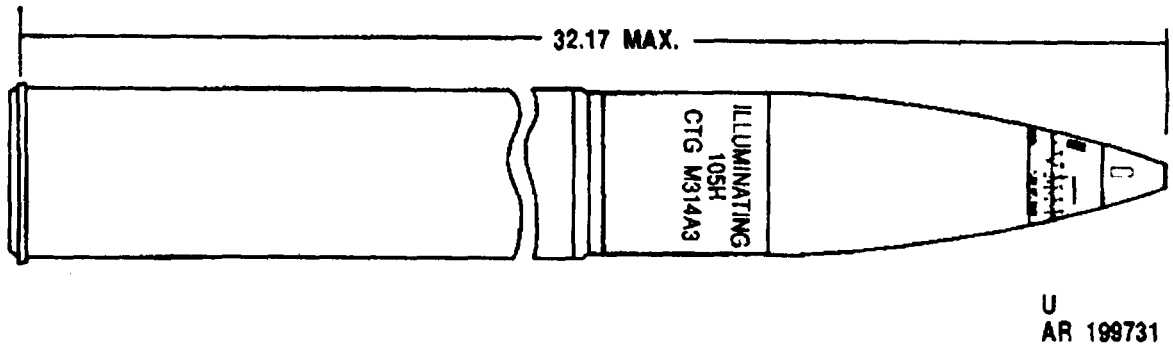
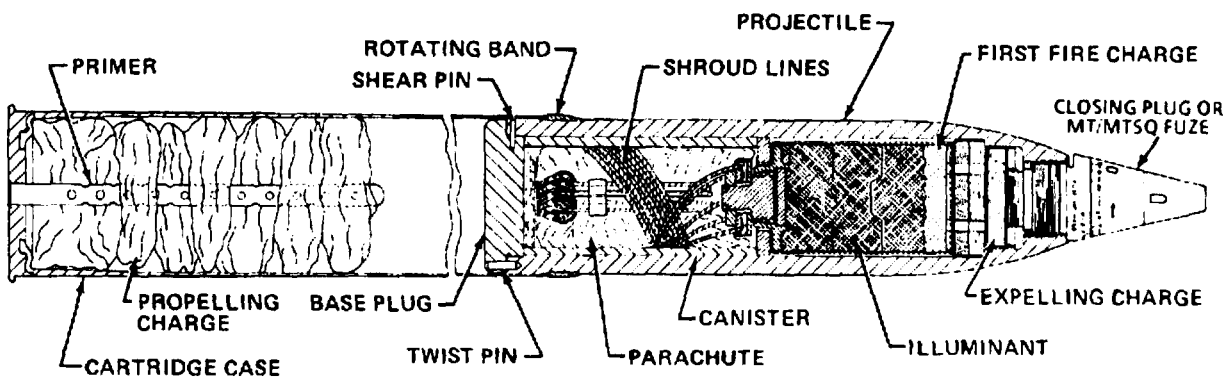
CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314A3





Type Classification:

Std AMCTC 7467, dtd 1970.

Use:

This cartridge is intended for signaling or for illuminating a designated area.

Description:

The projectile is a hollow steel forging with a streamlined ogive, a gilding metal rotating band, and a pinned base plug. The projectile is assembled with an MT or MTSQ fuze screwed into the nose. The projectile cavity contains an expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.18 lb of black powder contained in a sealed plastic holder. The illuminating canister body contains the illuminant and 0.15 lb of first fire composition.

The illuminating canister body is fitted with anti-rotational brakes. The parachute assembly is attached to the illuminating canister body. The base plug is inserted into the opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile assembly is free fitted to a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the

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black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which repels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing inflight stability. The MT fuze functions and ignites the expelling charge, in turn, igniting the first-fire composition in the illuminant canister. The expelling charge also ejects the illumination canister and parachute assembly from the base of the projectile by blowing out the base plug. Concurrently, the parachute deploys and inflates. The canister body rotation or spin is rapidly decreased by the anti-rotational brakes which open to the airstream when the canister is ejected, and the illuminant is ignited by the first-fire composition. Average luminosity is 450,000 candlepower with a static burning time of 60 seconds.

Tabulated Data:

Complete round:
- Type ---------- Illuminating
- Weight ---------- 46.43 lb
- Length ---------- 32.17 in.
- Cannon (weapon) used with ---------- M49 (M52, M52A1), M2A1, M2A2 (M101, M101A1), M103 (M108), M137 (M102)

Projectile:
- Body material ---------- Forged steel
- Color ---------- White w/black markings
- Expelling charge ---------- Black powder, 0.18 lb
- Filler and weight ---------- Illum, 1.97 lb
- Fuze ---------- MT. M565 or 548, MTSQ, M577A1, ET M762

Propelling charge:
- Cartridge case ---------- M14 series
- M14 ---------- Brass. 5.9 lb (approx)
- M14B4 ---------- Steel, 3 pc spiral wrap, 4.7 lb (approx) Propellant M67, 2.83 lb

Percussion primer assembly:

	M28A2	M28B2
Primer	M61, 0.00014 lb	M61, 0.00014 lb
Black Powder	Cl 1, MIL-P-223 (Note B), 0.043 lb	Cl 1, MIL-P-223 (Note B), 0.043 lb
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52 M52A1 and M101/M101A1

Charge	Muzzle Velocity (fps)	Maximum (reps)	Range (m)	Range yd
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10.260
7	1550	472.4	11,270	12,330

Maximum Range ---------- 11,270 m (12,330 yd)
Muzzle velocity ---------- 472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Maximum (reps)	Range (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum range ---------- 11,500 m (12,590 yd)
Muzzle velocity ---------- 494 mps (1621 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +145°F (+63°C)

Storage:
- Lower limit ---------- -65°F (-53 8°C)
- Upper limit ---------- +145°F (+63°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 114 lb
- Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32
- Cube ---------- 2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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Shipping and Storage Data:

Storage class/SCG	(08) 1.2G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
**DODAC	1315-C449
UNO serial number	0171
UNO proper shipping name	Ammunition, illuminating

Drawing number ---------- 9206821

**NOTE: Some M314A3 are issued w/o fuze (DODAC-1315-C542)

References:

SB 700-20
AMC-R 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20
TM 9-1300-251-34

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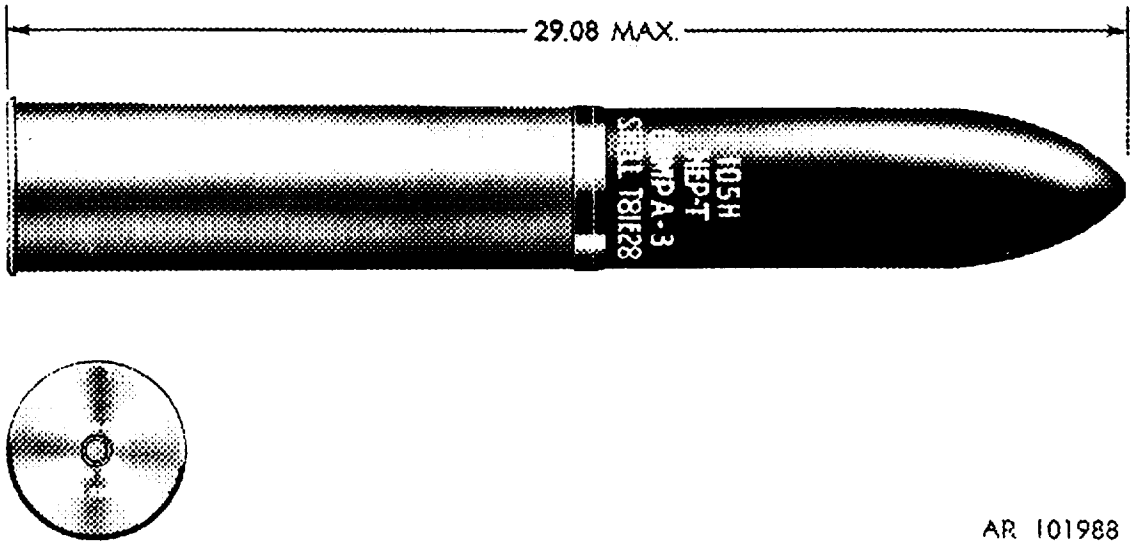
CARTRIDGE, 105-MILLIMETER: HEP, HEP-T, M327 (T81E28)



AR 101988

Type Classification:

Std OTCM 36841, dtd 1958.

Use:

This cartridge is used for both anti-tank and anti-personnel purposes.

Description:

The projectile is a thin walled steel cylinder with a relatively short ogive and a flat base. A gilding metal rotating band encircles the projectile slightly forward of the base. The base is fitted with a threaded adapter which accommodates a base detonating fuze which may or may not have an integral tracer, depending on the model. Rounds with tracers are classified as HEP-T. The projectile is loaded with 7.6 pounds of Composition A3. An M14 series cartridge case, containing a non-adjustable bagged charge of single granulation propellant, is loose-fitted over the base of the projectile. A percussion primer is press fitted into the base of the cartridge case.

Functioning:

When the weapon is fired, the primer (a percussion type initiated by the firing pin) ignites the propelling charge. The burning propellant creates gasses which force the spin stabilized projectile out of the gun tube and propels it to the target. (If the round is fitted with the M91 fuze, the tracer is also ignited by the burning propellant and burns during the early stages of flight). On impact, the functioning of the fuze detonates the explosive.

Tabulated Data:

Complete round:
- Type ---------- HEP
- Weight ---------- 33.45 lb
- Length ---------- 29.08 in.
- Cannon used with ---------- M2A1, M2A2, M49, M103, M137

Projectile:
- Explosive filler ---------- 7.6 lb Comp A3
- Body materiel ---------- Steel
- Color ---------- Olive drab w/yellow markings and black bands
- Cartridge case ---------- M14 (brass) M14B1 (steel)

Propellant:
- Type ---------- M6
- Weight ---------- 3.9 lb
- Primer ---------- M28A2, M28B2
- Tracer (when used) ---------- Integral w/fuze
- Fuze BD ---------- M91

Ballistics:

- Maximum range ---------- 9,500 yd; 8,685 m
- Muzzle velocity ---------- 2050 fps

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Temperature Limits:

Firing:	
Lower limits	-40°F
Upper llmlts	+125°F
Storage:	
Lower limits	-80°F (for periods not more than 3 days)
Upper limits	+160°F (for periods not more than 4 hr/day)
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight w/2 cartridges	120 lb
Dimensions OD	37-1/4 x 11-15/16 x 7-19/32 in.
Cube	2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C448
UNO serial number	0006
UNO proper shipping name	Cartridges for weapons
Drawing number	75-1-362

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20&P

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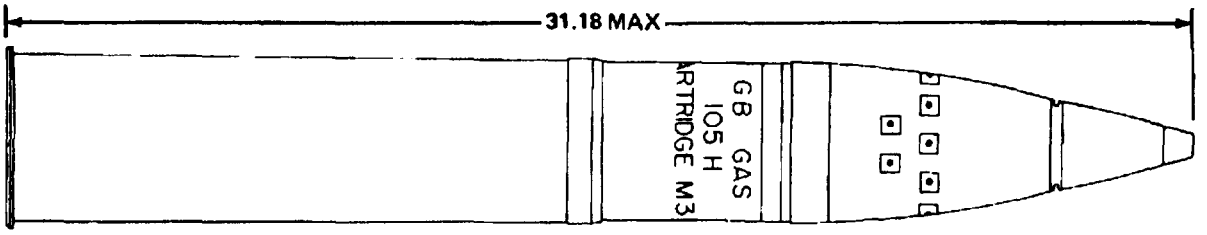
CARTRIDGE, 105-MILLIMETE: AGENT, GB, M360



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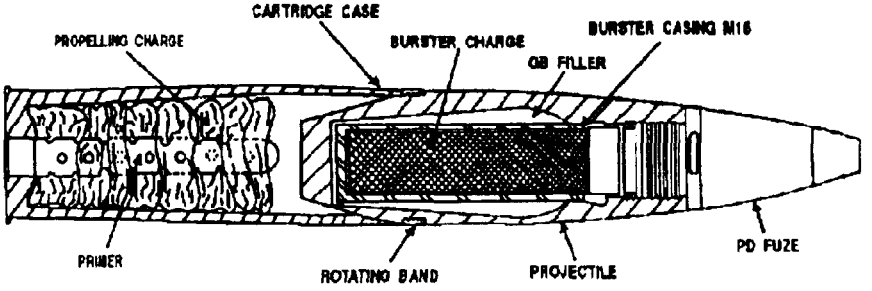

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AR 199738

Type Classification

Std OTCM 37119, dtd 1959.

Use:

This cartridge is used as a casualty producing round against personnel.

Description

This cartridge is similar in external appearance to Cartridge HE M1. The projectile consists of a hollow one-piece steel forging, press-fitted with an M16 burster casing containing an M40 tetrytol burster charge, or M40A1 Composition B4 charge. The hollow projectile cavity is filled with a GB non-persistent liquid chemical agent. The projectile has a boattailed base with stream-lined ogive and a gilding metal rotating band. A PD fuze is threaded into the nose of the projectile. The complete projectile assembly is free fitted into a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile prior to adjusting the char e and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer, which in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts s in to the projectile, providing flight stability. Projectile functioning is dependent upon the fuze used and may function on impact, instantaneous or delay. It can function above ground either at a predetermined height based upon time of flight or function in proximity with the target area. Fuze function detonates the burster charge, resulting in projectile rupture and dispersal of the chemical agent. The liquid agent evaporates, forming a non-persistent gas to envelope the area.

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Tabulated Data:

Complete round:

Type	Chemical Agent, GB, non-persistent
Weight	43.86 lb
Length	31.18 in.
Cannon used with	M2A1, M2A2, M103 and M137

Projectile:

Body material	Steel, forged or bar
*Color	Gray w/one green band and green markings (One yellow band w/explosive burster) (Later manufacture three green bands)
Filler and weight	GB, non-persistent, 1.63 lb

WEIGHT ZONES
LOADED SHELL W/O FUZE AND
W/O BURSTER CHARGE

Zone	Over lb	Up to and Incl lb	Marking
5	30.39	31.09	
6	30.99	31.59	
7	31.59	32.29	

No projectile wt zones lower than Zone 5.

Fuze	PD, M739, M557

Propelling charge:

Cartridge case	M14 series
Propellant	M67, 2.83 lb
Primer	M28A2, M28B2

Performance:
Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	Range (yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

Maximum range	11,270 m (12,330 yd)
Muzzle velocity	472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum range	11,500 m (12,590 yd)
Muzzle velocity	494 mps (1621 fps)

*NOTE: Renovated or newly manufactured projectiles will be marked with one green band and, if burstered, one yellow band.

Temperature Limits:

Firing:

Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)

Storage:

Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
*Packing	1 round in fiber container; 2 containers in wooden box

*Packing Box:

Weight	117 lb
Dimensions	37-1/4 x 11-5/16 x 7-19/32 in.
Cube	2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) 1.2
Storage compatibility group	K
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH GAS PROJECTILES
DODAC	1315-C441
UNO serial number	0020
UNO proper shipping name	Ammunition, toxic
Drawing number	75-1-363

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Limitations:

Do not fire or store Cartridge M360 assembled with Burster M40 (loaded with tetrytol) at temperatures exceeding +125°F (+52°C). This restriction is not applicable to Burster M40A1. Cartridges assembled with Burster M40A1 (M40E1) are authorized for use in all 105mm howitzer cannons. Cartridges assembled with Burster M40 are authorized for use in all 105mm howitzers except M108 and M102.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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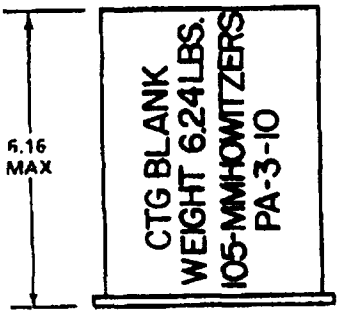
CARTRIDGE, 105-MILLIMETER BLANK, M395



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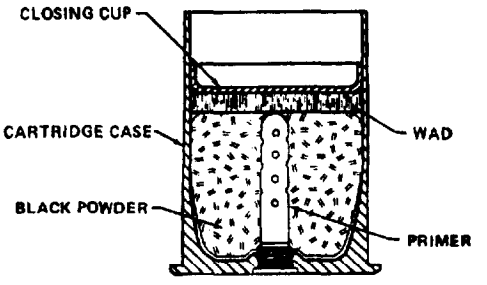

AR199712

Type Classification:

Std OTCM 38091, dtd 1962.

Use:

This cartridge is used for salutes and simulated fire.

Description:

The blank cartridge consists of a shortened cartridge case containing a black powder charge and primer. The shortened cartridge case is either brass, steel, or aluminum. The black powder charge in early production of this item is contained in a cloth bag and held in position by a closing cup or a plug assembly consisting of two pulp-board disks glued on either side of a hard felt disk and cemented in position about 0.5 inch from the mouth of the case. Renovated or newly manufactured blank cartridges are assembled with a loose powder charge contained by the cartridge case and retained by a fiberglass closing wad and a polystyrene closing cup glued in place with epoxy.

Functioning:

The weapon firing pin strikes the percussion primer igniting the black powder in the primer case, in turn, detonating the black powder charge which produces a loud report with flash and smoke.

Tabulated Data:

Complete round:	
Type	Blank
Weight	6.24 lb
Length	6.16 in.
Cannon (weapon) used with	M2A1, M2A2 (M101, M101A1), M49 (M52, (M52A1), M103 (M108), M137 (M102)
Propelling charge:	
Cartridge case	M15, Brass M15B1, Steel M15B2, Aluminum
Propellant	Black Powder, 1.7 lb
Primer	M1A2, M1B1A2
Percussion element	M61
Body	8838089-10 (M1B1A2) 8838089-14 (M1A2)
Charge	Black powder, 100 ± 6 grains

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (for periods not exceeding 3 days) (-63°C)
Upper limit	160°F (for periods not exceeding 4 hr/day) (+71°C)
*Packing	1 round in fiber container; 10 containers in wooden box

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*Packing Box:

Weight	96.0 lb
Dimensions	29-1/4 x 12-1/16 x 9-13/32 in.
Cube	1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC	1315-C440
UNO serial number	0327
UNO proper shipping name	Cartridges for weapons, blank
Drawing number	7549251

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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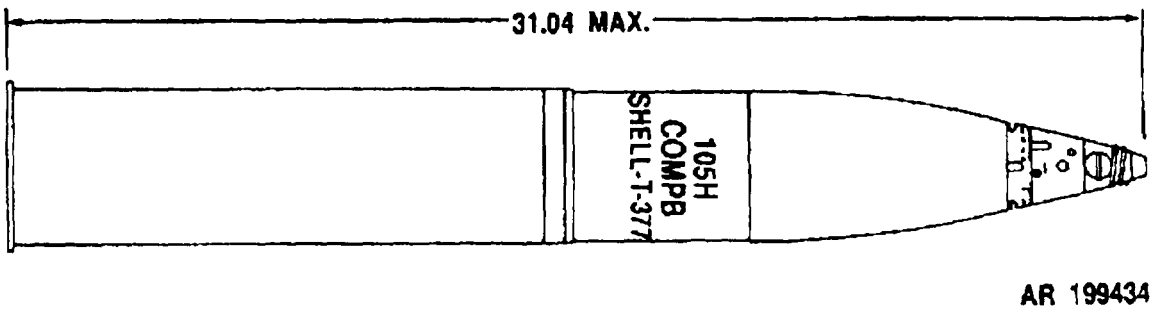
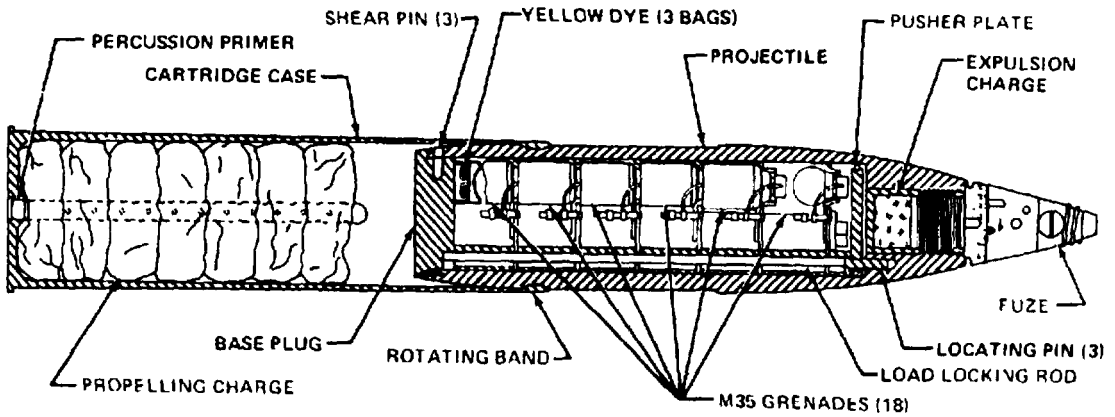
CARTRIDGE, 105-MILLIMETER: HE, M413 (T377E1)





Type Classification:

OBS MSR 11756003.

Use:

This cartridge is used to deliver a concentration of antipersonnel grenades.

Description:

The complete round consists of a projectile, a modified fuze, and a cartridge case, The projectile contains six layers of grenades with three grenades in each layer. Three of the grenades in each projectile contain a bag of yellow dye for spotting the burst. The grenades are contained by a base plug attached to the projectile with three shear pins.

A mechanical time superquick fuze incorporating an expulsion charge is installed in the nose of the projectile, and may be set to function at any time between 2 and 75 seconds. The modified fuzes incorporate an expulsion charge and are not interchangeable with unmodified fuzes of the same model. The cartridge case contains a percussion primer and a propelling charge divided in increments to permit adjustment for the desired firing charge. The lip of the cartridge case is a free fit over the base of the projectile.

Functioning:

When the primer is detonated by the tiring pin of the weapon, the flash from the primer ignites the propelling charge producing gases which propel the projectile from the barrel of the weapon. The rifling in the barrel imparts spin to the projectile, stabilizing it in flight. The fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight, The M35 grenade is a ground-burst submissive which explodes on impact.

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Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 42.0 lb
- Length ---------- 31.04 in.
- Cannon used with ---------- M2A1, M2A2, and M49

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow markings

Filler and weight:
- Number of grenades, M35 -- 18
- Explosive, Comp B, each grenade ---------- 28 grams
- Explosive, Comp, B, each projectile ---------- 1.1 lb
- Fuze ---------- MTSQ, M554 (Modified)

Cartridge Case:

Model	Mat'l	Wt. (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:
- Model---------- M67
- Components:

Increment	Prop Comp & Type	Web Size in. Approx	Wt Oz Approx	Perf
1	M1, Type II	0.014	8.6	Single
2	M1, Type II	0.014	1.4	Single
3	M1, Type I	0.026	2.5	Multi
4	M1, Type I	0.026	3.8	Multi
5	M1, Type I	0.026	5.8	Multi
6	M1, Type I	0.026	8.8	Multi
7	M1, Type I	0.026	14.3	Multi

Weight, Total Increments 1-7- 2.83 lb

Percussion mimer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity fps	mps	Maximum Range m	yd
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

- Maximum range ---------- 11,270 m, 12,330 yd
- Muzzle velocity ---------- 472.4 mps, 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

- Maximum range ---------- 11,500 m (12,590 yd)
- Muzzle velocity ---------- 494 mps (1621 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- +165°F (73.9°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight w/cartridge ---------- 120 lb
- Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
- Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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Shipping and Storage Data

Hazard class/division and Storage Compatibility Group --------- (18) 1.2E

DOT class ---------- Class A Explosive

DOT marking ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ---------- 1315-C469
Cartridge drawing number ---- XP97090
Packing drawing number ------ 7549072

References:

SB 700-20
AMC-P700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20
TM 9-1300-251-34

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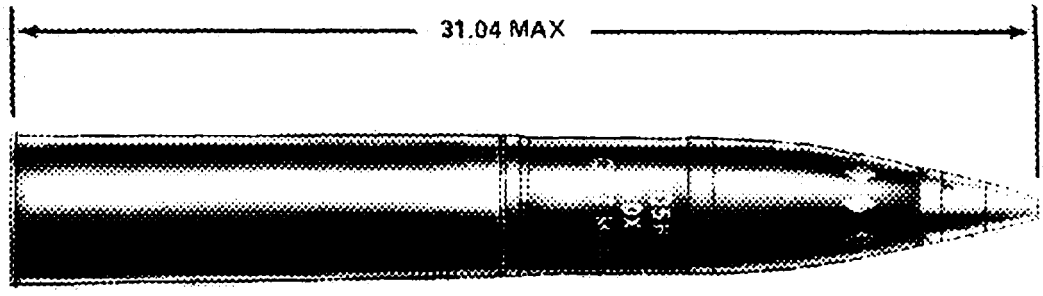
CARTRIDGE, 105-MILLIMETER: HE, M444



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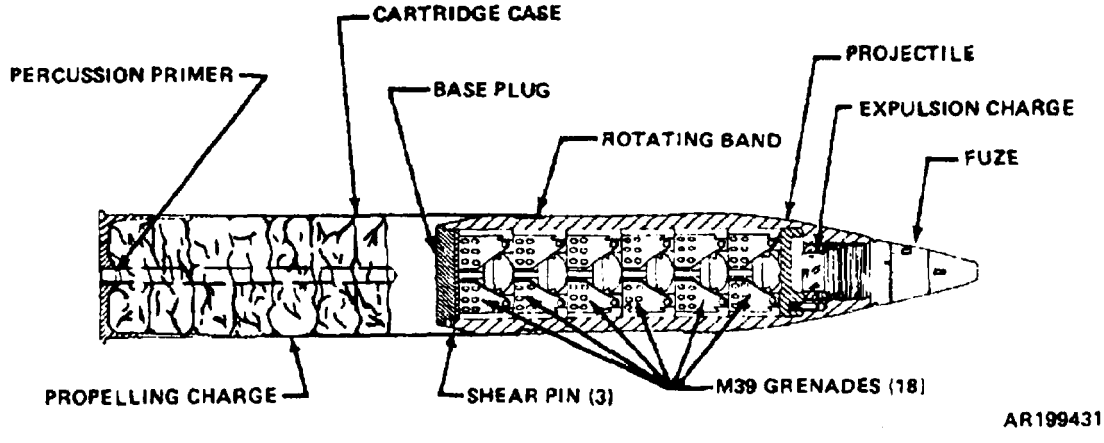

AR199431

Type Classification:

Std OTCM 37803 dtd 1961.

Use:

This cartridge is used to deliver a concentration of antipersonnel grenades.

Description:

The complete round consists of a projectile, a modified fuze, MTSQ, M548 or MT, M565, and a cartridge case, The projectile contains six layers of grenades with three grenades in each layer. The grenades are contained by a base plug attached to the projectile with three shear pins. A modified mechanical time and superquick or mechanical time fuze is installed in the nose of the projectile, and may be set to function at any time between 2 and 100 seconds. The modified fuzes incorporate an expulsion charge and are not interchangeable with unmodified fuzes of the same model. The cartridge case contains a percussion primer and a propelling charge divided in increments to permit adjustment for the desired firing charge. The lip of the cartridge case is a free fit over the base of the projectile.

Functioning:

When the primer is detonated by the firing pin of the weapon, the flash from the primer ignites the propelling charge, producing gases which propel the projectile from the barrel of the weapon. The rifling in the barrel imparts spin to the projectile, stabilizing it in flight. The fuze, having been set to function at a predetermined time in flight, initiates the expulslon charge, ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M39 grenade is an airburst submissive which is expelled from its housing on impact and projected upward to burst at 4 to 6 feet above the ground.

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Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 42.0 lb
- Length ---------- 31.04 in.
- Cannon used with ---------- M2A1, M2A2, M49, M103, M137, and M137E1

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow diamonds and markings

Filler and weight:
- Number of grenades, M39 -- 18
- Explosive, Comp A5, each grenade ---------- 23.55 grams
- Explosive, Comp. A5, each projectile ---------- 0.93 lb
- Fuze ---------- MT, M565 (modified) or MTSQ, M548 (modified)

Cartridge Case:

Model	Mat'l	Wt (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:
- Model ---------- M67

Components:

Increment No.	Prop Comp & Type	Web Size in. approx	Wt Oz approx	Perf.
1	M1, Type II	0.014	8.6	Single
2	M1, Type II	0.014	1.4	Single
3	M1, Type I	0.026	2.5	Multi
4	M1, Type I	0.026	3.8	Multi
5	M1, Type I	0.026	5.8	Multi
6	M1, Type I	0.026	8.8	Multi
7	M1, Type I	0.026	14.3	Multi

Weight, Total Increments 1-7 ---------- 2.83 lb

Percussion primer assembly:

	M28A2 (Note B)	M28B2 (Note B)
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223	Cl 1, Spec MIL-P-223
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

- Maximum range ---------- 11,270 m, 12,330 yd
- Muzzle velocity ---------- 472.4 m, 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

- Maximum range ---------- 11,500 m, 12,590 yd
- Muzzle velocity ---------- 494 m, 1621 fps

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- +165°F (73.9°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

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*Packing Box:
Weight w/cartridge ---------- 120 lb
Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Hazard class/division and Storage Compatibility Group ---------- (18) 1.2E
DOT class ---------- Class A Explosive
DOT marking ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C462
UNO serial number ---------- 0321
UNO proper shipping name --- Cartridges for weapons
Cartridge drawing number ---- 8864930
Packing drawing number ------ 7549072

Limitations:

Expect a higher submunition dud rate when fired at charges 6 and 7 for Cannons M103, M137 and L28A1.

References:

SB 700-20
AMC-P700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20
TM 9-1300-251-34

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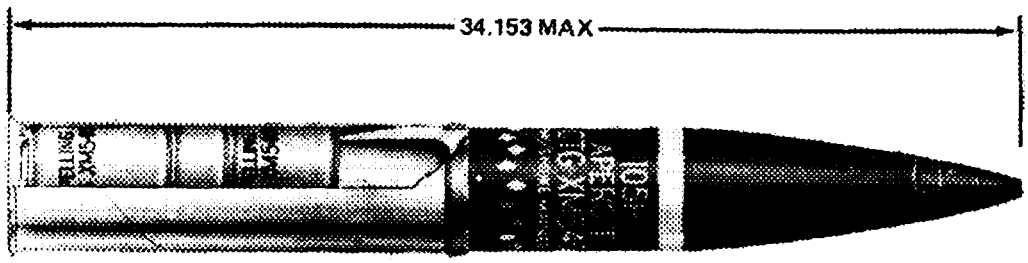
CARTRIDGE, 105-MILLIMETER: APERS-T, M546



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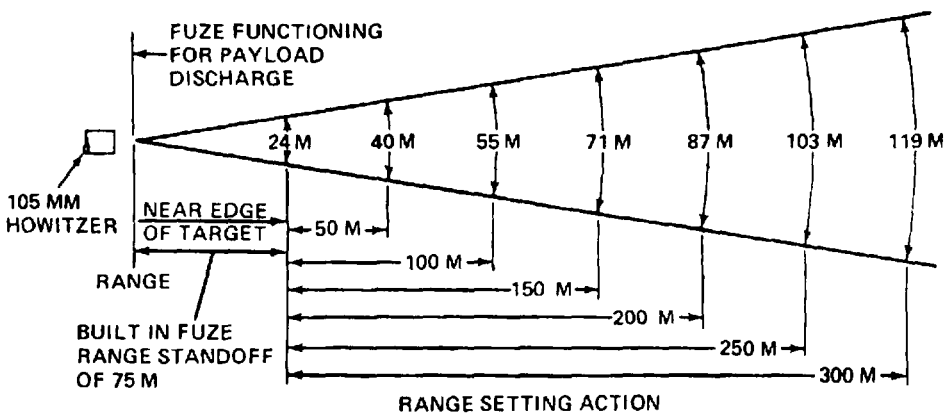

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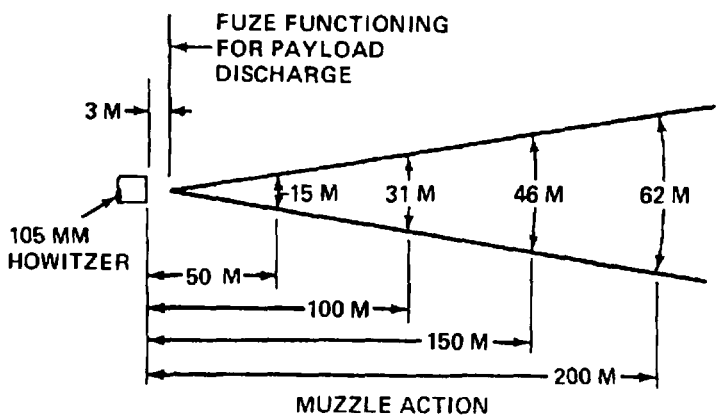

AR199724

Type Classification:

Std MSR 09736030, dtd 1973.

Use:

This cartridge is designed for use against personnel in direct fire, muzzle action, and in a direct fire mission with a time setting other than muzzle action.

Description:

The projectile body is an assembly of four pieces: base with sintered iron rotating band and M13 Tracer, connector, forward body and fuze adapter. Inside the base of the projectile is a base charge. Forward of the base charge are assembled the tiers of flechettes, the centers of which form a flash tube. The fuze adapter is assembled forward of the first tier of flechettes, The fuze adapter contains an M87

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detonator, M7 relay, four radially oriented M86 detonators and a pyrotechnic composition smoke marker pellet. The MT Fuze M563 series is assembled into the fuze adapter. The cartridge case contains a percussion primer assembly and two individually bagged propelling charge increments, one numbered Zone 6 and the second, Zone 7. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and perforated flash tube containing benite. The two increment bags are tied together with acrylic cord. The 6th increment is assembled around the primer flash tube at the base end of the cartridge case. The 7th increment is assembled around the flash tube toward the mouth of the cartridge case. The fuze may be set for muzzle action, for functioning at a minimum of 1/2 second or in tenths of a second up to 100 seconds after firing.

Functioning:

Prior to loading, the propelling charge is adjusted by cutting the cord and removing Zone 7 if Zone 6 is to be fired. If Zone 7 is to be fired, the charge is not touched. Also, if other than muzzle action is desired, the fuze is set. The cartridge is then loaded into the chamber of the cannon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube and initiates the M13 Tracer. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing inflight stability. When the fuze functions, it initiates the pyrotechnic composition smoke marker, the four radial M86 detonators, and M7 relay simultaneously. The four detonators break the forward body into four longitudinal pieces and projectile spin disperses the first four tiers of flechettes. Projectile forward velocity is imparted to the flechettes. The M7 relay initiates the M87 detonator which flashes through the flash tube formed by the tiers initiating the base charge. The base charge then propels the last five tiers of projectiles from the connector and spin disperses the flechettes. If the fuze is set for muzzle action, it will function within three meters of the cannon muzzle. If set for time, i.e., 1/2-100 seconds, the fuze will function 75 meters prior to set time for optimum palyload dispersal. The payload pattern of dispersal is shown in Figure AR 199740. The tracer provides visual tracking of projectile trajectory.

Tabulated Data:

Complete round:
- Type ---------- APERS-T
- Weight ---------- 38.25 lb
- Length ---------- 34.153 in. (max)
- Cannon (weapon) used with ---------- M2A1, M2A2, (M101, M101A1), M137 (M102) (L20A1 (Ml19)

Projectile:
- Body material ---------- Aluminum/ Steel
- Color ---------- Olive drab wlyellow band, white markings and a row of white diamonds
- Filler and weight ---------- 8,000-8 gr flechettes. 9.145 lb

Components:
- Cartridge case ---------- M14B4
- Propelling charge ---------- XM121
- Increment loading assy ------ 6.2 oz propellant, M30A1 single perforation, type II, 0.019 Web. 27.4 oz propellant M30A1, multi perforation, type I, 0.039 Web. Charge, Propelling for Ctg. APERS M546
- Primer ---------- M90
- Benite strands ---------- 380+/-grains
- Percussion primer drawing - 7645339
- Tracer ---------- M13
  - 1.7 grains igniter composition
  - 5.5 grains tracer composition
- Fuze ---------- MT-M563-E1, -E2, -E3, -E4

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Performance:
Range and velocity data:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(yd)
Charge 6 (M101/ M101A1)	1265	385	9500	10,400
Charge 7 (M101/ M101A1)	1635	504	11,600	12,690
Charge 6 (M102/ M108)	1408	429	10,100	11,050
Charge 7 (M102/ M108)	1800	549	12,400	13,590

Temperature Limits:

Firing:
Lower limit ---------- -40°F (-40°C)
Upper limit ---------- +125°F (+52.0°C)
Storage:
Lower limit ---------- -80°F (for periods not more than 3 days) (-62.2°C)
Upper limit ---------- +145°F (+63°C)
*Packing ---------- 1 round per fiber container; 2 containers per wooden box
*Packing Box:
Weight ---------- 122 lb
Dimensions ---------- 44-3/4 x 12-1/16 x 7-9/16 in.
Cube ---------- 2.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S,

Shipping and Storage Data

Quantity-distance class --------- (12) 1.2
Storage compatibility group -- E
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C513
UNO serial number ---------- 0321
UNO proper shipping name --- Cartridges for weapons
Drawing number ---------- 9211669

Limitations:

Cartridge M546 is not to be fired over the heads of friendly troops and is restricted to firing at Zone 7 only, however, when engaging stationary targets at ranges between 275 and 400 meters, Zone 6 firings with a fuze setting of 0.5 second is permitted.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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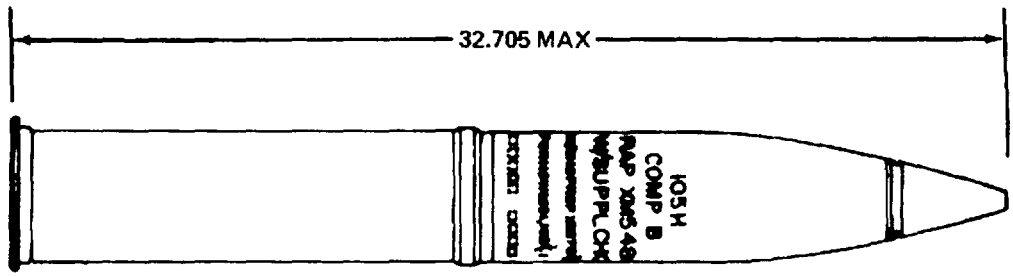
CARTRIDGE, 105-MILLIMETER: HERA, M548



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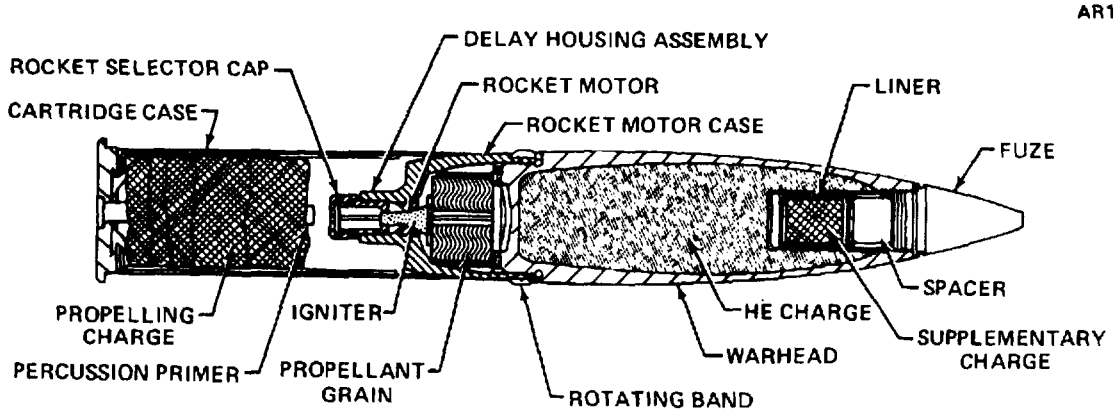

AR199732

Type Classification:

Std AMCTC 8414, dtd 1971.

Use:

This cartridge is a high explosive, rocket assisted round with extended range capability used for fragmentation, blast and mining in support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boattail design. The nose of the warhead is threaded for a fuze and the warhead is filled with cast Composition B having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and rocket ignition system, contained in a spike at the rear of the body. The spike housing ignition system is fitted with a cap. A sintered iron rotating band is swaged to the rocket motor body and the body threaded to the warhead to complete the projectile assembly The cartridge case contains a primer and five individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing benite. The five numbered increment bags are tied together, in numerical order, 3, 4, 5, 6 and 7 with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 3 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

Rocket "OFF-MODE" — If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile, and if required, is set. The cartridge is loaded into the weapon. Upon firing, impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the benite in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact

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(instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with target area. Fuze function detonates the HE projectile filler resulting in projectile fragmentation and blast.

Rocket "ON-MODE" — The fuse is assembled to the projectile as in the Rocket "OFF-MODE". The rocket cap, on the spike of the projectile, is removed and the cartridge case with propellant is slipped over the projectile and the cartridge loaded into the weapon. After firing, the burning propellant gases initiate the ignition composition which, in turn, ignites the delay composition. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the balance of the rocket motor ignition system ignites the rocket motor. The rocket motor burns for 2 seconds boosting the projectile velocity resulting in a greater projectile range. Fuze initiation, as described for Rocket "OFF-MODE", detonates the projectile HE filler resulting m projectile fragmentation and blast.

Tabulated Data:

Complete round:
- Type ---------- HERA
- Weight ---------- 38.5 lb
- Length ---------- 32.7 in.
- Cannon (weapon) used with ---------- M49 (M52, M52A1), M2A1, M2A2 (M101 M101A), M103 (M108), M137 (M102)

Projectile:
- Body material ---------- High carbon steel forging
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 5.2 lb
- Fuzes ---------- Prox M728, PD, M739, M557 MTSQ M564, MTSQ M582, and ET M767

Propelling charge:
- Cartridge case:
  - M14 ---------- Brass, 5.9 lb (approx)
  - M14B1 ---------- Steel, down, 5.4 lb (approx)
  - H14B4 ---------- Steel, 3 pc spiral wrap, 4.7 lb (approx)
- Propelling charge ---------- M176, 2.84 lb
- Percussion primer assembly ---------- M108
- Primer ---------- Dwg No. 9212386
- Benite (BP) ---------- 210 grains
- Motor body ---------- Steel alloy forging
- Rocket propellant grain ----- XM33 propellant Nitrocellulose base 1.06 lb

Delay assembly:

No. increments	Weight	Composition
1	250 mg	Flash
6	950 mg (ea)	Delay
1	200 mg	Igniter

Flash composition:

Constituent	Parts by wt
Zirconium	58 ± 1.0
Chromium oxide	16 ± 1.0
Molybdenum trioxide	25 ± 1.0
Vinyl alcohol Acetate resin (solids)	1.0 ± 0.1

Igniter composition:

Constituent	Parts by wt
Zirconium	65 ± 1.0
Iron oxide	25 ± 1.0
Diatomaceous earth	10 ± 1.0
Vinyl alcohol Acetate resin (solids)	1 ± 0.1

Delay composition:

Constituent	Parts by wt
Tungsten	42.5 ± 5
Barium chromate	45 ± 5
Potassium perchlorate	12.5 ± 0.25
Vinyl alcohol Acetate resin (solids)	1 ± 0.1

Rocket propellant grain igniter:
Type 1 Class 3 boron potassium nitrate pellets 5.0 grains (approx)

Performance:
- Maximum range ---------- 16,404 yd (15,000 m)
- Muzzle velocity ---------- 548.64 mps (1,800 fps)

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Temperature Limits:

Firing
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- + 145°F (+63C°)

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- + 150°F (+65.6°C)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 122 lb
- Dimensions ---------- 45-19/32 x 11-13/16 x 7-11/16 in.
- Cube ---------- 2.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

Quantity-distance class --------- (12) 1.2
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMO FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C463
UNO serial number ---------- 0321
UNO proper shipping name --- Cartridges for weapons
Drawing number ---------- 9212376

Limitations:

Charge 7 is authorized for firing in both Rocket-On and Rocket-Off modes. Charges 3, 4, 5, and 6 are authorized for Rocket-Off Mode firing only under emergency combat conditions.

Reference:

SB 700-20
AMC-P700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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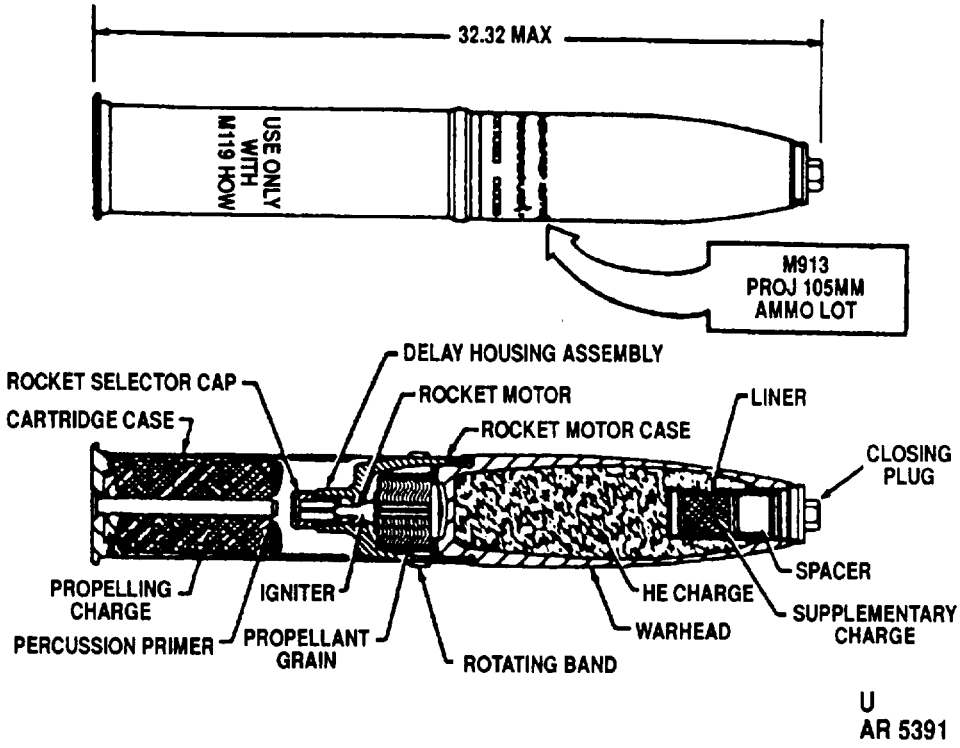
CARTRIDGE, 105-MILLIMETER: HERA, M913



Type Classification:

Std AMCTC dtd 1990.

Use:

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boattail design. The nose of the warhead is threaded for a fuze and the warhead is filled with TNT having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and delay ignition system, contained at the rear of the body. The delay ignition system is fitted with a cap. A copper rotating band is welded to the rocket motor body. The body is threaded to the warhead to complete the projectile assembly The cartridge case contains a primer and a single bag propelling charge with a flash reducer. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder.

Functioning:

Rocket "OFF-MODE" — If the projectile is unfuzed, the closing plug is removed and a fuze is assembled to the projectile and, if required, is set. The cartridge is loaded into the weapon. Upon firing, impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propelling gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with target area. Fuze function detonates the HE projectile filler resulting in projectile fragmentation and blast.

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Rocket "ON-MODE" — The fuze is assembled to the projectile as in the rocket "OFF-MODE". The cap on the delay igniter is removed, The cartridge is loaded into the weapon. Upon firing, the burning propellant gases initiate the delay ignition system. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the delay ignition system ignites the rocket motor. The rocket motor burns for 2 seconds boosting the projectile velocity resulting in a greater projectile range. Fuze initiation, as described for Rocket "OFF-MODE", detonates the projectile HE filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:
- Type ---------- HERA
- Weight ---------- 38.5 lb
- Length ---------- 32.3 in.
- Cannon (weapon) used with ---------- M119

Projectile:
- Body material ---------- High carbon steel forging
- Color ---------- Forest green w/yellow markings
- Filler and weight ---------- TNT, 5.8 lb
- Fuzes ---------- PD M739 Prox M732E2, ET M767, MTSQ M582
- Suppl charge ---------- Dwg No. 8797090

Propelling charge:
- Cartridge case:
  - M14B4 ---------- Steel, 3 pc spiral wrap, 4.7 lb (approx)
  - Propelling charge ---------- M229, 4.25 lb
  - Percussion primer assembly ---------- M28B2
  - Primer ---------- Dwg No. 8838130
  - Black powder ---------- 300 grains
  - Motor body ---------- Steel alloy forging

Pyrotechnic Delay Assembly:

No. Increments	Weight	Composition
7	1025 mg (ea)	Delay
1	290 mg	Igniter
1	300 mg	Flash

Delay Composition:

Constituent	Parts by Weight
Potassium Perchlorate	14.5 ± 0.25
Tungsten	45.0 ± 5.0
Vinyl Alcohol-Acetate Resins (solids)	1.0 ± 0.1
Barium Chromate	40.5 ± 5.0

Igniter Composition:

Constituent	Parts by Weight
Diatomaceous Earth	10.0 ± 1.0
Zirconium	65.0 ± 1.0
Iron Oxide	25.0 ± 1.0
Vinyl Alcohol-Acetate Resins (solids)	2.0 ± 0.1

Flash composition:

Constituent	Parts by Weight
Zirconium	58.0 ± 1.0
Chromium Oxide	16.0 ± 1.0
Molybdenum Trioxide	25.0 ± 1.0
Vinyl Alcohol-Acetate Resins (solids)	1.0 ± 0.1

Rocket propellant:
- Grain ---------- HTPB
- Weight ---------- 2.2 lb

Temperature Limits:

Firing:
- Lower limit ---------- -50°F (-45.5°C)
- Upper limit ---------- 145°F (63°C)

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- 160°F (71.1°C)

Performance with the Ml19 Howitzer:

- Maximum range ---------- 19.5 km
- Muzzle velocity ---------- 625 mps (2100 fps)
- Chamber pressure at 70°F ----- 45000 psi
- Chamber pressure at 145°F---- 54000 psi

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***Packaging:**

Packing	1 round in fiber container; 1 container in metal container
Metal container:	
Total weight	54.5 lb
Dimensions	44-1/2 x 6-7/8 x 6-7/8 in.
Cube	1.2 cu ft

- alternate packing -

Packing	1 round in fiber container; 2 containers in wooden box
Packing box:	
Weight	122 lb
Dimensions	45-19/32 x 11-13/16 x 7-11/16 in.
Cube	2.4 cu ft

*NOTE: See DOD Consolidated Amunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOD hazard class	1.1
DOD Storage Compatibility Group	E
DOT shipping class	CLASS A EXPLOSIVE
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C546
UNO serial number	0321
UNO proper shipping name	Cartridges for weapons
Drawing number	9390990

Limitations:

To Be Determined.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1300-251-34

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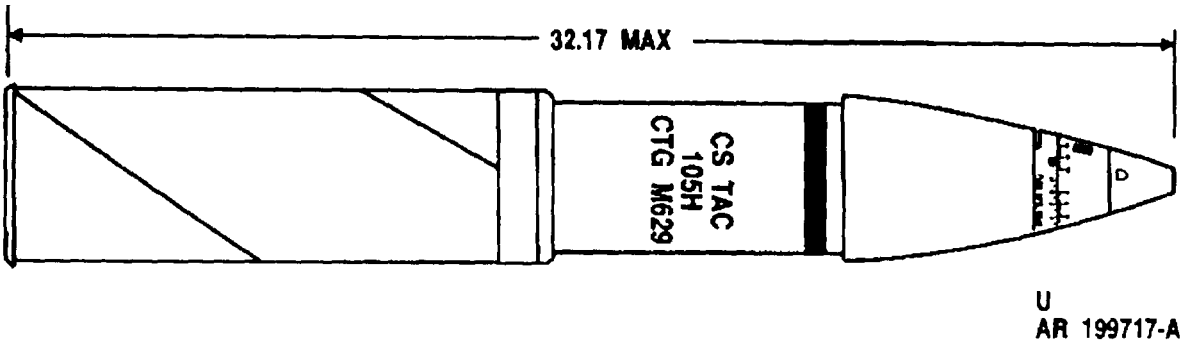
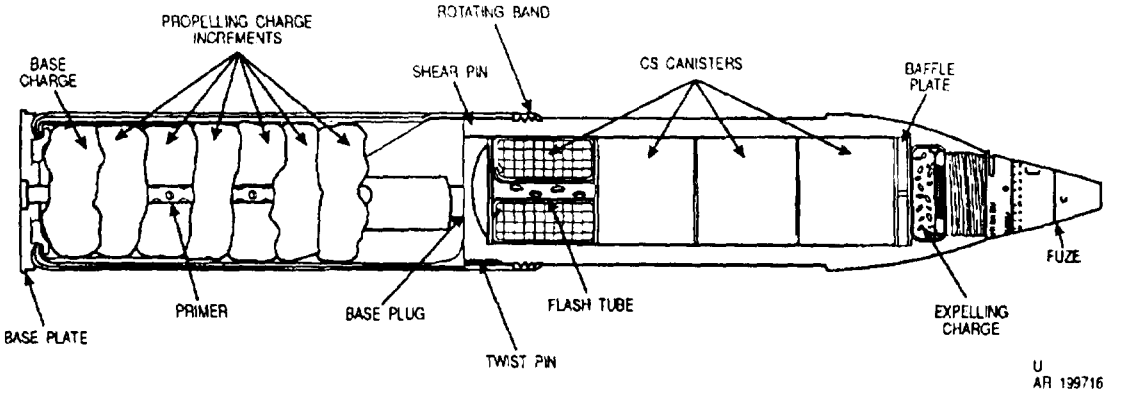
CARTRIDGE, 105-MILLIMETER: TACTICAL CS, M629





Type Classification:

CONT MSR 03736119, dtd 1973.

Use:

This cartridge contains a CS riot control agent which emits irritating fumes intended to harass personnel.

Description:

This cartridge is similar in external configuration to Illuminating Cartridge M314A2E1. The projectile consists of a hollow steel forging with streamlined ogive, gilding metal rotating band, and pinned steel base plug. An MT or MTSQ fuze is internally threaded into the nose of the projectile. The projectile cavity contains an expelling charge and four CS pyrotechnic-filled canisters. The expelling charge consists of 1.78 oz of black powder in a plastic container. It is assembled to the rear of the fuze and separated from the CS canisters by an aluminum baffle plate with flash hole. Each CS canister contains 0.825 lb of CS pyrotechnic mix and 0.81 oz of starter mix. Located in the center of each (CS canister is a perforated flash tube. The baseplug is held in place by three shear pins and three twist pins. The complete projectile assembly is free-fitted to a steel cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered inclement bags are tied together, in numerical order. with acrylic cord. These are assembled into the cartridge case around the primer flash tube with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash

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tube provides for uniform ignition of the propelling charge producing a rapid expansion of the pro propellant gas which propels the projectile out the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with the target area. The fuze functions and ignites the black powder in the expelling charge. The flash from the expelling charge ignites the four CS canisters through the perforations in the flash tubes. Concurrently, the pressure from the ignition of the expelling charge shears the retaining pins, blows out the base plug and expels the burning canisters into the airstream. The CS pyrotechnic mixture in the canisters burns and emits irritating fumes for approximately 60 seconds.

Tabulated Data:

Complete round:

Type	Riot control, CS
Weight	42.0 lb
Length	32.17 in.
Cannon (weapon) used with	M49 (M52, M52A1), M2A1,M2A2 (M101, M101A1), M103 (M108), M137 (M102)

Projectile:

Body material	Forged steel
Color	Gray w/1 red band and red markings (1 yellow band with explosive burster)
Filler and weight	Starter mixture, riot mixture CS, 6.66 lb
Fuze	MTSQ M548, MT M565

Propelling charge:

Cartridge case	M14 series:
M14	Brass, 5.9 lb (approx)
M14B1	Steel, drawn, 5.4 lb (approx)
M14B4	Steel, 3 piece, spiral wrap 4.7 lb (approx)

Percussion primer assembly:

	M28B2	M28A2
Primer & weight	M61, .00014 lb	M61, .00014 lb
Black powder	C1 1, MIL-P-223 (Note B)	C1 1, MIL-P-223 (Note B)
Weight	0.043 lb	0.043 lb
Body	Steel, Type 2	Brass, Type 1

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

Maximum range	11,270 m (12,330 yd)
Muzzle velocity	472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum range	11,500 m (12,590 yd)
Muzzle velocity	494 mps (1621 fps)

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-40°F (-40°C)
Upper limit	+145°F (+63°C)

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*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
Weight ---------- 120 1b

Dimensions ---------- 37-1/4 x 11-15/16 x 7-19/32 in.
Cube ---------- 2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- (12) 1.2
Storage compatibility group --- G
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH CS PROJECTILES CLASS B DOT SPECIAL PERMIT NO. 5208
DODAC ---------- 1315-C468
UNO serial number ---------- 0018
UNO proper shipping name --- Ammunition, tear-producing
Drawing number ---------- 9220225

Limitations:

Do not fire this cartridge with the fuze set on the "S" shipping mark as issued, because fuze functioning after approximately 2 seconds may be anticipated, Do not attempt to reset the fuze until just before firing. Fuzes reset for firing, but not fired, should be reset on the "S" setting.

References

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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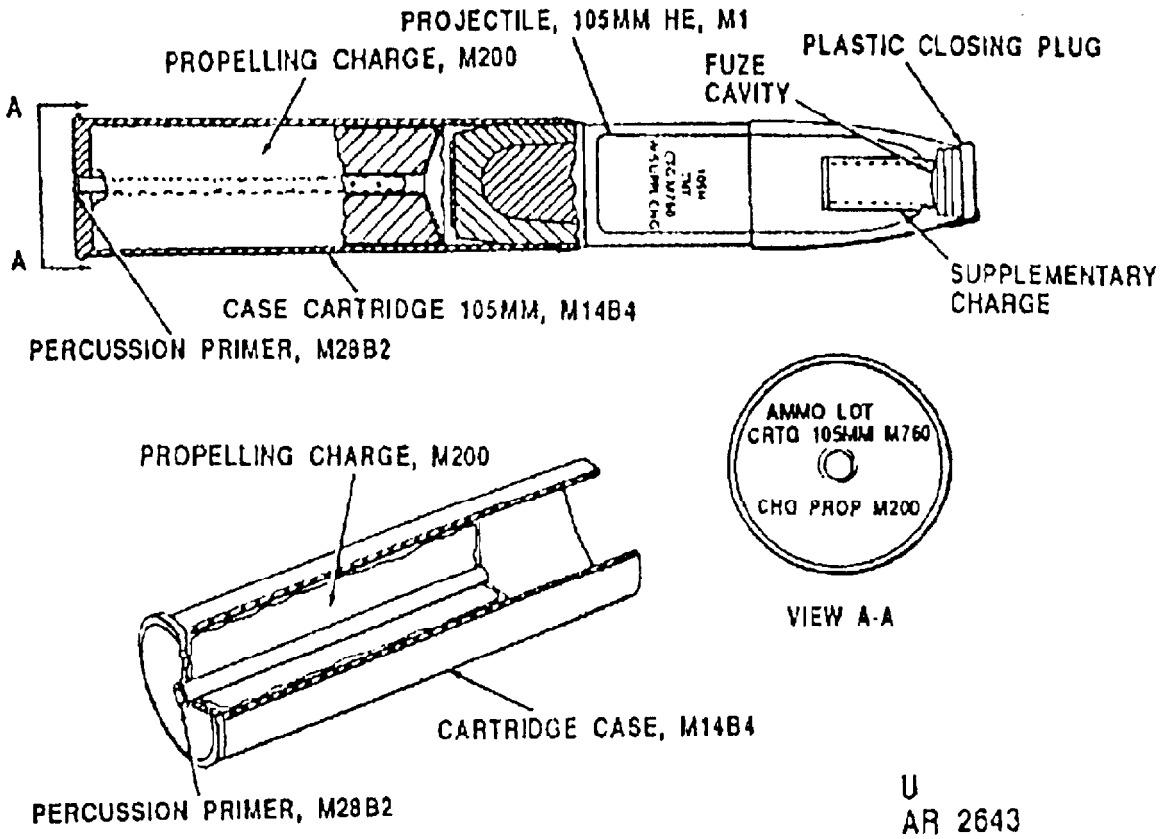
CARTRIDGE, 105-MILLIMETER: HE, M760



Type Classification:

Std, MSR 09786043.

Use:

This cartridge is a high explosive round initially developed for use with the Howitzer, Light Towed, 105mm: Soft Recoil, M204, Currently, the M760 Cartridge is only authorized for use with the Howitzer, Light, Towed, 105mm: M119.

Description:

The projectile of this cartridge consists of hollow steel forging and is similar to the projectile in the M1 cartridge. The projectile is loaded with approximately 4.6 lb (2.1 kg) of Type 1 TNT only. "Composition B" cannot be loaded with cartridge M760 as it is too sensitive for use with propelling charge M200. The propelling charge M200 is a single bag charge consisting of 4.25 lb (1.93 kg) of M30 propellant, The bag charge has a hole through the center for fitting around the primer in the cartridge case. The M200 propelling charge is for extended range firing (Charge 8) for 105mm, Howitzer M119 use only.

The cartridge case used is the M14B4 (3-piece spiral-wrapped steel). The mouth of the case can expand slightly by uncoiling, This makes it easier to insert the projectile in the mouth of the case, However, if the loader is not careful to grasp the projectile at its center of balance, the lip of the mouth of the cartridge may protrude enough to catch on the lip of the lower extractor recess, making it impossible to chamber the round, The cartridge case may be manually rotated and seated with no adverse effect on the ammunition, The primer used is the M28B2 percussion primer (300 grains of black powder).

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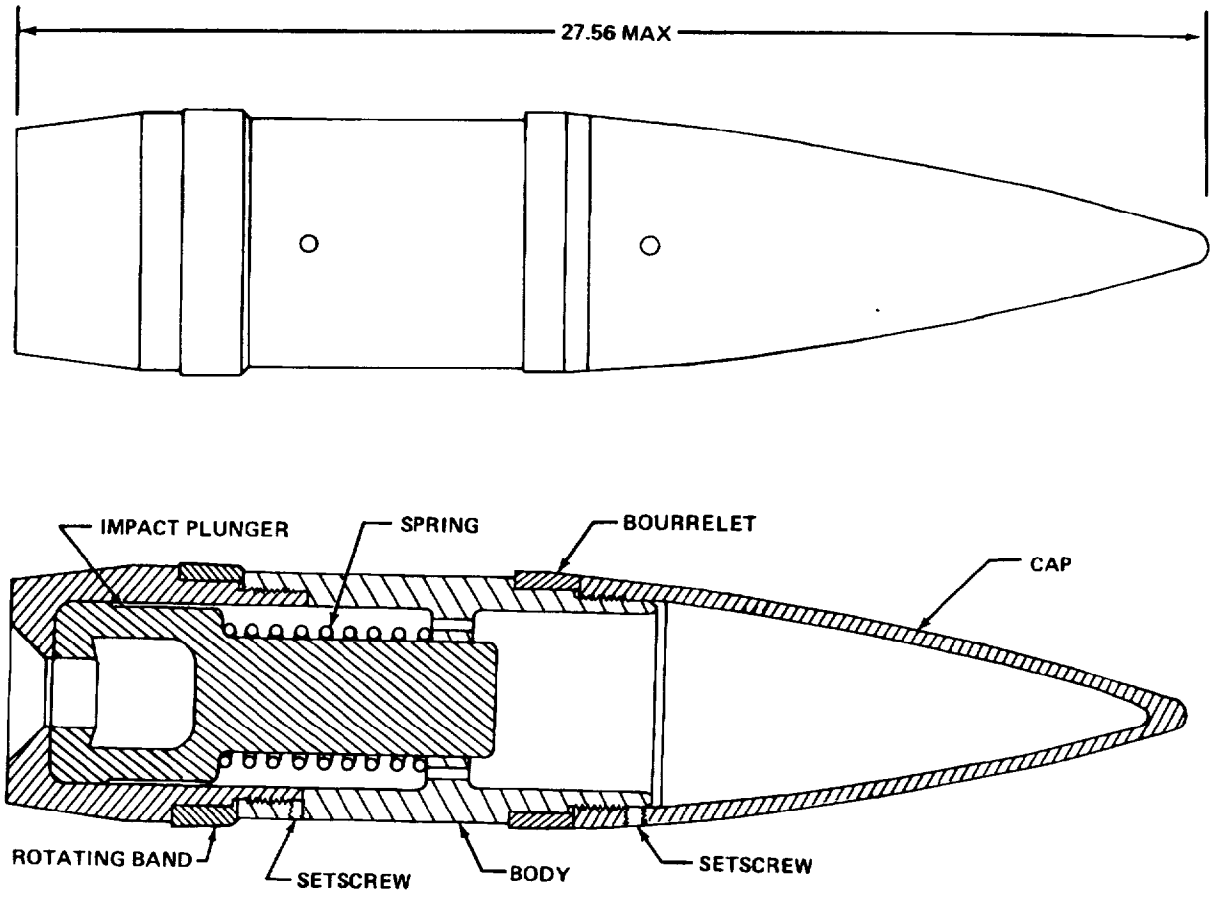
PROJECTILE, 155-MILLIMETER: DUMMY, M7 AND M7B1 WITH CHARGE, PROPELLING: DUMMY, M2



AR199662

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

This dummy projectile and dummy propelling charge are inert and are used for training troops in handling ammunition and loading weapons.

Description:

The dummy projectile has a bronze cap, a steel body, a bronze forward hand (to simulate a bourrelet) and a bronze rear hand (simulating a rotating band). In configuration, weight and center of gravity, the projectile resembles a service round. The body is hollow and contains a spring-loadd impact plunger to assist in extraction from the weapon. Exterior markings indicate weapons with which the dummy projectile may he used. The dummy propelling charge is also inert and simulates a service charge in size and weight.

Functioning:

Since both projectile and propelling charge are: inert, the only functioning involved is the action of the internal plunger in the projectile. When the round is rammed into the forcing cone of the cannon barrel, the plunger is pushed forward against the plunger spring. On rebound, the plunger strikes the internal base to loosen the projectile in the forcing cone and assist in extraction through the breech.

Difference Among Models:

M7 projectiles are to be used for training with gun cannons only. However, M7B1 projectiles are also suitable for loading in howitzers. Roth projectiles are identical except that the M7 cap is made of bronze and the M7B1 cap is made of malleable iron.

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Tabulated Data:

Complete round:

Type	Inert
Cannon used with	Howitzers M1, M1A1,M45,M126, M126A1,M185, M199,M284 Guns M2, M2A1, M46

Projectile:

Body material	Cast steel
Weight	95 lb
Length	27.56 in.

Color:

Old mfg	Blue or black w/white markings
New mfg	Bronze w/white markings

Propelling charge:

Weight	7.371
Length	11.0 in.
Primer	Expended M82 or MK2A4 depending on weapon used with
Fuze	None
*Packing	1 projectile in wooden crate; 2 propelling charges M2 per metal container M13A2

*Crate:

Weight	106 lb
Dimensions	33-3/8 x 10-1/8 x 10-1/8 in.
Cube	1.98 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data.

Quantity-distance class	00
Storage compatibility group	N/A
DOT shipping class	00
DOT designation	PROJECTILE NON-EXPLOSIVE

DODAC:

Dummy Projectile	1320-D553
Dummy Propelling Charge	1320-D539

Assembly Dwg No:

Dummy Projectile	72-l-69
Dummy Propelling Charge	72-2-54

Limitations:

References

SB 700-2
AMC-P 700-3-3

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Ballistics: (cont.)

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Limitations:

This ammunition is not tobe fired or stored at temperatures higher than 125°F because of the tetrytol burster.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Limitations:

This ammunition is not to be fired or stored at temperatures above +125°F because of the terytol burster. When temperatures are above 111°F, the WP in the ammunition will melt and become liquid. If the temperature drops, it will solidify. If the WP solidifies in munitions stacked on their sides, the ballistics of the rounds will be changed; therefore, it is required that the WP munitions will be stacked in an upright position at all times.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025 -200-12&P
TM 9-1025-211-10
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	98000	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Limitations:

When temperatures are above 111 degrees F, the WP in the ammunition will melt and become liquid. If the temperature drops, it will solidify. If the WP solidifies in munitions stacked on their sides, the ballistics of the rounds will be changed; therefore, it is required that the WP munitions will be stacked in an upright position at all times.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	268.2	6100	729.2
4, M3, green bag	310.9	7800	749.6
5, M3, green bag	371.9	9700	760.7
3, M4A1, white bag	274.3	6300	702.7
4, M4A1, white bag	316.4	8000	729.9
5, M4A1, white bag	374.6	9700	720.6
6, M4A1, white bag	463.3	12000	759.8
7, M4A1, white bag	563.9	14600	740.8

Cannon M126/M126A1:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M126/M126A1:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M199: (cont.)

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5,M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10

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Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (m)	Range Elevation (mil)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	268.2	6100	729.2
4, M3, green bag	310.9	7800	749.6
5, M3, green bag	371.9	9700	760.7
3, M4A1, white bag	274.3	6300	702.7
4, M4A1, white bag	316.4	8000	729.9
5, M4A1, white bag	374.6	9700	720.6
6, M4A1, white bag	463.3	12000	759.8
7, M4A1, white bag	563.9	14600	740.8

Cannon M126/M126A1:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

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Limitation:

When contingency plans so require, these projectiles may be transported fully assembled with explosive components. Otherwise, assembly is prohibited except for storage and use.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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WEIGHT ZONES
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up to & Incl	Markings
2	99.1 (41.3 kg)	100.3 (45.5 kg)	⊡ ⊡
3	100.3 (45.5 kg)	101.3 (45.9 kg)	⊡ ⊡ ⊡
4	101.3 (45.9 kg)	102.6 (46.5 kg)	⊡ ⊡ ⊡ ⊡
5	102.6 (46.5 kg)	103.6 (47 kg)	⊡ ⊡ ⊡ ⊡ ⊡
6	103.6 (47 kg)	104.8 (47.5 kg)	⊡ ⊡ ⊡ ⊡ ⊡ ⊡

Ballistics:

Howitzer, Self-Propelled, M109 (M126A1 Cannon):

Charge	Muzzle velocity (mps)	Max Range (m)
1,M3A1, green bag	200	3640
2, M3A1, green bag	224.5	4570
3, M3A1 green bag	253.9	5590
4, M3A1, green bag	293.5	7080
5, M3A1, green bag	349.5	9050
3, M4A2, white bag	334.2	6490
4, M4A2, white bag	310.1	7720
5, M4A2, white bag	363.5	9420
6, M4A2, white bag	445.0	11730
7, M4A2, white bag	535.2	14320

Howitzer, Self-Propelled, M109A1/M109A2 (M185 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
**1, M3A1, green bag	180.9	2980
**2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4. M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3. M4A2, white bdg	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/M119A1 white bag	650.0	17740

Howitzer - M198 Towed (M199 Cannon):

Charge	Muzzle Velocity (m/s)		Max Range (m)
Propelling Charge-Green bag	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167
Propelling Charge - White bag	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Charge	Muzzle velocity (m/s)	Max Range (m)
Propelling Charge - M119/M119A1		
8	655.8	17740
Propelling Charge - M119A2		
7R	660.0	17740

**Firing below charge 3 may result in stickers when fired in M185 and M199 Cannons.

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

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Cannon M126A1:

Charge	Muzzle Velocity (mps)	Max Range to Function (m)	Elevation (mil)	Fuze setting (sec)
1, M3A1, green bag	211.4	2949	931.0	24.5
2, M3A1, green bag	239.1	3923	924.6	29.2
3, M3A1, green bag	282.6	5587	920.3	36.0
4, M3A1, green bag	324.7	7236	852.7	39.0
5, M3A1, green bag	385.6	8816	856.6	44.1
3, M4A2, white bag	275.0	5293	921.4	34.9
4, M4A2, white bag	320.7	7057	898.8	40.4
5, M4A2, white bag	380.0	8635	898.7	45.7
6, M4A2, white bag	473.6	10,993	855.0	50.7
7, M4A2, white bag	576.5	13,586	879.2	59.7

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range to Function (m)	Elevation (mil)	Fuze Setting (sec)
*1, M3A1, green bag	213.6	2970	995.1	26.8
2, M3A1, green bag	240.3	3933	954.7	30.3
3, M3A1, green bag	281.0	5569	874.2	34.0
4, M3A1, green bag	323.3	7155	896.4	40.7
5. M3A1. green bag	381.7	8721	865.6	44.3
3, M4A2, white bag	309.8	6746	865.1	37.9
4, M4A2, white bag	353.2	7949	906.3	43.9
5, M4A2, white bag	408.4	9317	870.0	46.4
6, M4A2, white bag	488.9	11,304	885.5	53.4
7, M4A2, white bag	576.5	13,586	878.5	59.7
8, M119/ M119A1	696.7	17,086	856.5	68.0

*NOTE: Charge 1 is restricted to emergency combat use only.

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range to Function (m)	Elevation (mils)
1. M3A1. green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4. M3A1. green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4. M4A2. white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2; white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

Limitations:

Reliability of projectiles M485A1 and M485A2 degrades rapidly when firing at Zones 6 and 7 with fuze settings of 10 seconds or less. Model M485 is restricted to firing at Zones 1 through 6. Model M485 is also restricted to a firing temperature range of 40°F to 145°F.

When firing the 155mm illuminating projectile at Zone 1 from the M114A1 howitzer, effective illumination times less than 90 seconds should be expected.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

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Ballistics:

Howitzer	Propelling Charge	Charge	Muzzle Velocity (m/s)	Maximum Range
M114A2	M4A2	7	560.8	19,300
M109 (M109A1 M109A2) M109A3)	M4A2	7	560.8	19,300
	M4A2		567.5	19,500
	M119A1, A2	8,7	678.2	23,500
M198	M4A2	7	567.5	19,500
	M119A1, A2	8,7	678.2	23,500
	M203	8	826.0	30,100

Limitations:

M549 and M549A:

The M549/M549A1 cannot be fired if the obturating band is missing or broken.

There are no firing tables for rocket off firings of the M549/M549A1. The M549/M549A1 will be fired rocket-on only (rocket cap removal).

The M549/M549A1 cannot be fired in the M199 cannon if origin wear in the cannon exceeds 0.093 inches.

Use of the M119 propelling charge with the M549/M549A1 is prohibited. Rocket motor ignition failures resulting in short rounds will occur.

A 6000 meter safety zone is required short of the target because of the possibility of rocket motor non-ignition.

M549:

The M549 model cannot be fired with the M203 propelling charge.

References:

AMC-P 700-3-3
TM 9-1300-251-34
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-1025-211-10
TM 9-2350-311-10
TM 9-2350-314-10
TM 43-0001-28-4
TM 43-0001-28-5
TM 43-0001-28-6
TM 43-0001-28-7
TM 43-0001-28-8
TM 43-0001-28-9
TM 43-0001-28-10

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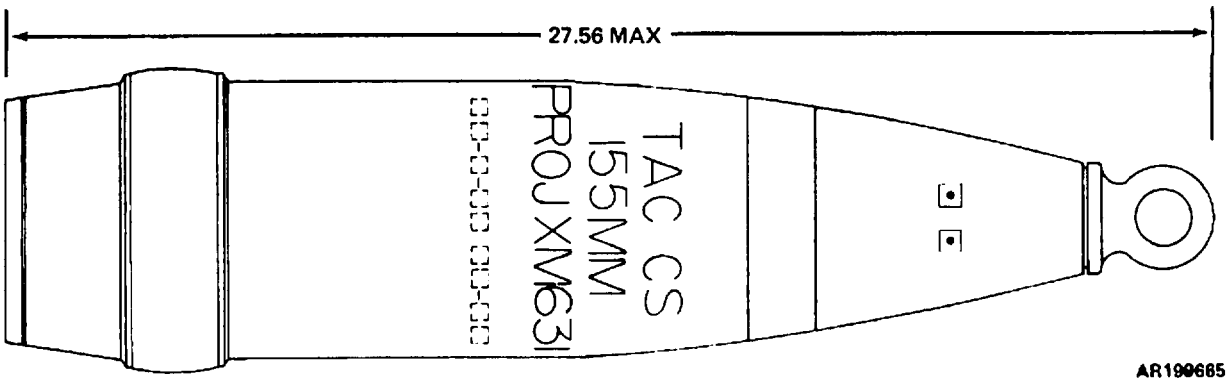
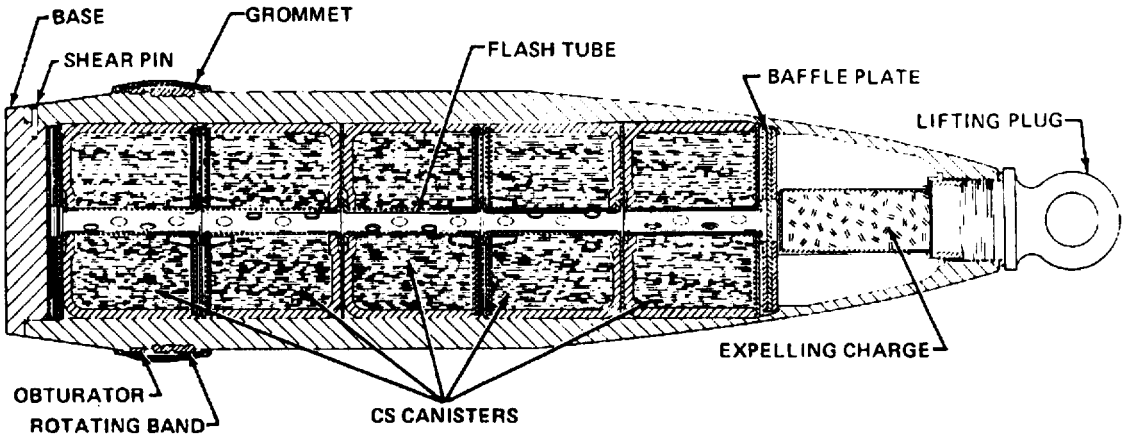
PROJECTILE, 155-MILLIMETER: TACTICAL CS, XM631





Type Classification:

Use:

This projectile is fired from 155mm howitzers and is used to harass personnel by emitting CS irritant fumes.

Description:

The base-ejecting type projectile is a hollow steel shell containing five stacked canisters. Each canister is filled with approximately two pounds of CS-Pyrotechnic mix and 0.81 ounce of starter mix. An expelling charge of 3.36 ounces of black powder in a plastic container is located in the nose of the projectile below the fuze cavity. A baffle plate with a central hole separates the expelling charge from the top canister. A central perforated tube runs through each canister to form a flash tube extending the length of the stack from the expelling charge to the base of the projectile. The base is a steel plug secured by three shear pins. An MTSQ fuze is used with this projectile. For shipment and handling, a lifting plug is installed in the fuze cavity. A gilding metal rotating band and a plastic obturating band encircle the projectile near the base, and are protected by a grommet for shipment and handling.

Functioning:

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The obturating band expands, forming a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the flash tube to ignite the CS canisters, blow off the base, and expel the burning canisters. The average canister burning time is 90 seconds. The effect of the CS agent on personnel is burning off the eyes, coughing, and difficulty in breathing.

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Tabulated Data:

Complete round:
- Type ---------- Tactical CS
- Weight with fuze ---------- 96.75 lb (approx)
- Length w/o lifling plug ------ 23.79 in.
- Cannon used with ---------- M1, M1A1, M45, M126, M126A1, M185

Projectile:
- Body material ---------- Steel
- Color ---------- Gray wired bands and red markings
- Filler and weight ---------- CS, 14.05 lb
- Propelling charge ---------- M3/M4 series
- Primers ---------- M82, MK2A4
- Fuze ---------- MTSQ M548

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upperlimit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)
- *Packing ---------- 8 projectiles on pallet

*Pallet:
- Weight ---------- 782 lb
- Dimensions ---------- 27-1/8 x 13-5/8 x 32 in.
- Cube ---------- 6.8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- 4
Storage compatibility group --- A
DOT shipping class ---------- B
DOT designation ---------- TACTICAL CS PROJECTILES CLASS SPECIAL PERMIT NO. 5208
DODAC ---------- 1320-D581
Assembly Dwg. No. ---------- 9220382

Limitations:

Do not fire with fuze set as issued. If impact detonation is intended instead of time functioning, set the fuze for 90 seconds.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10

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Howitzer, Self-Propelled, M109: (cont.)

Charge	Muzzle Velocity (m/s)	Max Range (m)
5, M4A2, white bag	363.5	9420
6, M4A2, white bag	445.0	11730
7, M4A2, white bag	535.2	14320

Howitzer, Self-Propelled, M109A1/M109A2 (M185 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
*1, M3A1, green bag	180.9	2980
*2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/ M119A1	650.0	17740

*Firing Below Charge 3 may result in stickers when tired in M185 and M199 Cannons.

Howitzer-M198 (M199 Cannon):

Charge	Muzzle Velocity (m/s)		Max Range (m)
Propelling Charge-Green Bag			
	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167
Propelling Charge-White Bag			
	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650
Propelling Charge-M119/M119A1			
8	655.8		17740
Propelling Charge-M119A2			
7R	660.0		17740

Howitzer, Towed, M114A2
Firing Tables not compiled at this time

Weapons fired from:

M109, M109A1, M109A2, M114A2, M198

Weapon/Propelling Charge/Prmer/ Combinations:

M109/M3A1. M4A2/M82
M109A1/M3A1, M4A2, M119, M119A1, M119A2/M82
M114A2/M3A1, M4A2/MK2A4, MK15
M198/M3A1, M4A2, M119, M119A1/M119A2, M82

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

For classified data pertaining to this item refer to TM 43-0001-28-1(C).

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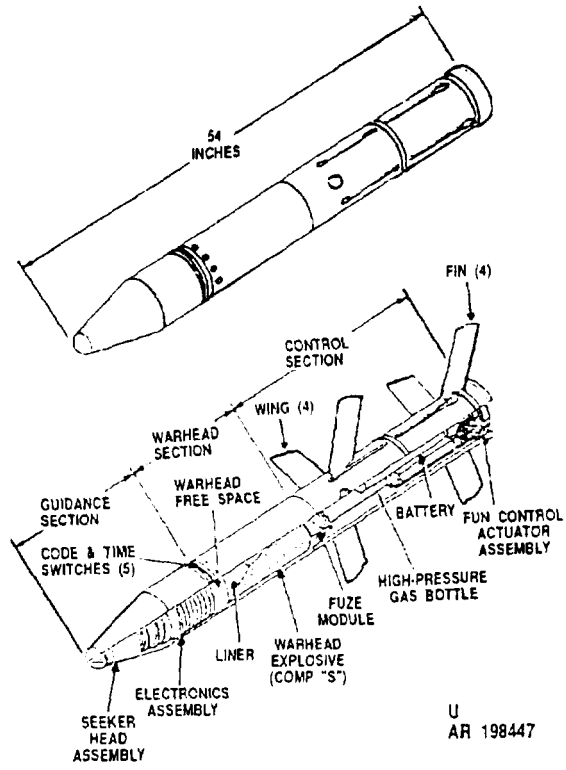
PROJECTILE, 155-MILLIMETER: HEAT GUIDED, CANNON-LAUNCHED, M712



Type Classification:

Standard, MSR 11796005.

Use:

Cannon Launched Guided Projectile; M712, Copperhead, is a 155mm, separate loading, laser-guided, high-explosive, projectile. It is intended to be used against tanks, armored vehicles, and other moving or stationary hardened targets. The M712 projectile is designed for use with M109A1/A2/A3, M198, and M114A2 howitzers.

Description:

The M712 projectile consists of three main sections: a forward section (guidance section), a center section (warhead or payload section), and an aft section (control section).

The guidance section consists of two major assemblies: the seeker head assembly and the electronics assembly. The laser detector, decoding circuits, gyro, and all of the electronic circuits that stabilize and control the flight of the projectile to the target are contained in this section. Also, there are several components of the fuzing system physically located in the guidance section. These include a dual section direct impact sensor (DIS) located in the forward end of the seeker head assembly and six shock wave sensors (SWS) located strategically throughout the guidance section. Also, there are five screwdriver-set switches located in the forward bourrelet. These switches, identified as code and time switches, are set by the howitzer crew just prior to loading and firing the projectile.

The warhead section is classified as high explosive antitank warhead. The housing is a cylindrical steel shell with a cone-shaped liner located at the forward end and a fuze conpartment located at the aft end. The explosive filler, consisting of 14.75 pounds of Composition B, is cast into the space between the liner and the fuze compartment. A cylindrical shaped fuze assembly (module) fits into the fuze compartment. The fuze module consists of a dual-channel safety and arming (S&A) device, two detonators, two explosive actuators, two explosive leads, and a single booster charge, Except for the booster, the fuze is a dual-channel redundant system where both channels are totally independent of one another and where initiation of either channel will cause normal functioning of the warhead explosive charge.

The control section contains a battery that provides electrical power, a high-pressure gas bottle that provides pneumatic power, four fins, four wings, and the mechanism to extend

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and actuate these control surfaces during flight. The housing for the control section is a cylindrical steel shell. The forward end is designed to mate with the warhead section by means of an internal-fitting splice ring. The aft end is designed to receive a screw-on aft closure (base) with a rotating plastic obturator. The obturator is retained between the aft closure and the control section housing. It is designed to not only seal off propelling charge gases but the rotating feature of the obturator reduces the spin of the projectile to approximately 10 revolutions per second. This spin rate is sufficient to deploy the fins, but slow enough to allow the control surfaces to stabilize the projectile through the entire flight. The base of the M712 projectile is designed to receive an extractor device used to unload the projectile from the gun tube.

The projectile is shipped and stored in a sealed metal container. The container is a top-opening design which provides full environmental protection during normal handling and storage operations. Containerized projectiles are normally stored and transported on pallets designed to be compatible with standard Army storage and transporting facilities and equipment.

Functioning:

The M712 projectile is designed for indirect firing operations only. However, the projectile trajectory can be programmed for either of two modes. In the ballistic mode, the projectile is fired on a high trajectory. Just past the apex of the trajectory, the projectile sees the target through reflected laser energy and steers on a steep path to the target. The second mode is the glide mode. The trajectory for the glide mode is generally flatter than the ballistic mode so that the projectile can fly under and out of cloud ceilings. In this mode, the guidance section applies different glide characteristics to the projectile control surfaces, allowing it to fly a relatively low flat trajectory. Either mode is selected by specific settings of the switches.

Except for the trajectory differences for the ballistic and glide modes, the projectile functions in the same manner for all firings. Before the projectile is loaded in the tube, the code and time switches located in the forward bourrelet are set to a five digit command originating from the Fire Direction Center. The five switch settings will program a time delay based on the duration of the flight, will set up the projectile for a ballistic or glide flight, and will key the projectile's code detector to match the pulse code of the laser designator used by the Forward Observer calling for the fire mission. When the round is fired, the setback and acceleration forces initiate the mechanical arming portion of the fuze S&A. These forces also cause the fins to unlatch and a portion of the battery to activate. On leaving the tube, the fins snap out by centrifugal force, and lock in the extended position. After the time delay set in by the code and time switches has expired, the main portion of the battery will activate, providing electrical power to all of the electronic circuits in the projectile. At the approximate midpoint of the trajectory, the wings will be deployed and the roll control and guidance functions will take over the flight of the projectile. When the projectile receives and decodes the laser energy reflected from the target, the projectile will steer onto a gliding intercept course to the target. At the same time, the fuze will become electrically armed. When the projectile hits the target, either the direct impact sensors or the shock wave sensors will trigger the fuze detonators and the warhead will function.

Tabulated Data:

Type	HEAT
Weight	138 lb
Length	54 in.
Weapon used with	M198, M109A1/A2/A3 M114A2 howitzers
Body material	Steel
Projective ogive (nose cone) material	Plastic
Color	Black w/yellow markings
Filler and weight	Comp, B 14.75 lb
Propelling charge	M3A1, M4A2, M119, M119A1, M119A2
Primer	M82
Container:	
Weight (without projectile) - (with projectile)	67.5 lb 205.5 lb)
Length	61 in.
Height	11.375 in.
Width	11 in.
Cube	4.4 cu ft
Color	Forest green w/yellow markings
Packaging:	
Quantity	6 projectiles per pallet
Pallet weight	1358 lb
Dimensions:	
Length	61 in.
Height	27.5 in.
Width	33 in.
Cube	32 cu ft

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Weapons fired from:

M109, M109A1, M109A2, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

M109/M3A1, M4A2/M82, M109A1/M3A1, M4A2, M119, M119A1/M119A2/M82, M109A2/M3A1, M4A2, M119, M119A1/M82, M114A2/M3A1, M4A2/MK2A4, MK15, M119A2, M198/M3A1, M4A2, M119, M119A1/M119A2/M82

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

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Ballistics:

Howitzer, M198 (M199 Cannon):

Charge	Muzzle Velocity (mps)		Max Range (m)
	Propelling Charge - Green Bag M3A1		
	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167
	Propelling Charge - White Bag M4A2		
	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650
	Propelling Charge - M119/M119A1		
8	655.8		17740
	Propelling Charge - M119A2		
7R	660.0		17740

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-1025-200-12&P
TM 9-1025-211-10
TM 9-2350-314-10

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Howitzer, Self-Propelled, M109A1/M109A2 (M185 Cannon):

Charge	Muzzle Velocity (reps)	Max Range (m)
*1, M3A1, green bag	180.9	2980
*2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7. M4A2. white bag	546.5	14650
8, M119/ M119A1	650.0	17740

*Firing below charge 3 with M185 and M199 Cannons may result in stickers.

Howitzer - M198:

Charge	Muzzle Velocity (mps)		Max Range (m)
	Propelling Charge - Green Bag		
	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167

Propelling Charge - White Bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Propelling Charge - M119/M119A1

8	655.8	17740

Propelling Charge -M119A2

7R	660.0	17740

Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

M109/M3Al, M4A2/M82
M109A1/M3A1, M4A2 M119, M119A1, M119A2/M82
M114A2/M3A1, M4A2/MK2A4, MK15
M198/M3A1, M4A2, M119, M119A1/M119A2, M82

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

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Charge	Muzzle Velocity (mps)		Max Range (m)
	Propelling Charge - White Bag		
	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	459.7	12150
7W	546.2	543.2	14650
	Propelling Charge - M119/M119A1		
8	655.8		17740
	Propelling Charge - M119A2		
7R	660.0		17740

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-314-10

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Howitzer, M198 (M199 Cannon):

Charge	Muzzle Velocity (mps)		Max Range (m)
Propelling Charge - Green Bag			
	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167
Propelling Charge - White Bag			
	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	459.7	12150
7W	546.2	543.2	14650

Propelling Charge-M119/M119A1		
8	655.8	17740
Propelling Charge-M119A2		
7R	660.0	17740

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-1025-200-12&P
TM 9-1025-211-10
TM 9-2350-314-10

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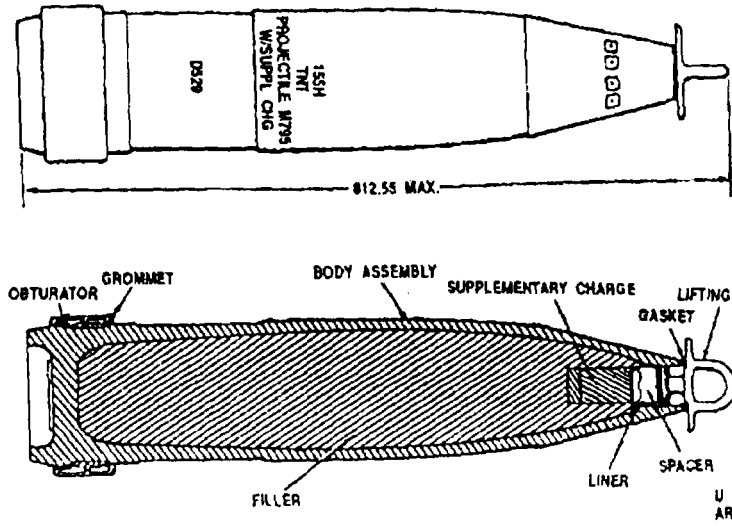
PROJECTILE, 155-MILLIMETER: HE, M795



Type Classification:

STD MSR 07856004.

Use:

This projectile is part of the new family of ballistically similar 155mm Howitzer ammunition. It will eventually replace the 155mm HE M107 projectile. The M795 projectile will be utilized to provide conventional support fires for division/corps elements.

Description:

The configuration of the M795 projectile will be similar to the M483A1 externally, except that it is two inches shorter. The M795 projectile consists of 23.8 pounds of TNT explosive loaded into a 78.1 pound body assembly. A gilding metal rotating band encircles the high fragmentation steel HF-1 body near its base. The obturator is plastic. The base is protected by a carbon steel base plate. The projectile is fitted with a protective lifting plug at the nose and a grommet which protects the rotating band during shipping and handling. The projectile uses impact, mechanical time, and short intrusion proximity fuzes. The M795 projectile has a supplementary charge which should not be removed since firing long intrusion proximity fuzes is not authorized. The projectiles have a lifting plug designed to protect the projectile nose area against accidental damage. The new plug has an oversized (3-3/4 in.) flange. If this protective lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile can not be fuzed. No attempt should be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The obturator behind the rotating band forms a seal to prevent leakage of gas pressure past the projectile. Rapidly expanding gases from the burning propellant charge propel the projectile through the barrel with the velocity necessary to reach the target. At the target, the warhead filler is detonated by the fuze. The fuze mode can be either impact, preset time, or proximity depending on fuze selection.

Tabulated Data:

WEIGHT ZONES
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over kg	Over lb	Up to & Incl kg	Up to & Incl lb	Marking
2	44.9	99.0	45.5	100.3	⊡ ⊡
3	45.4	100.1	46.0	101.4	⊡ ⊡ ⊡
4	45.8	101.0	46.6	102.7	⊡ ⊡ ⊡ ⊡
5	46.4	102.3	47.0	103.6	⊡ ⊡ ⊡ ⊡ ⊡
6	46.9	103.4	47.5	104.7	⊡ ⊡ ⊡ ⊡ ⊡ ⊡

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Complete Round:
- Type ---------- High Explosive
- Approx weight ---------- 103.4 lb - 46.90 kg
- Length ---------- 33.2 in. (84.33 cm)
- Cannons used ---------- M185, M199, M1A2, M126A1

Projectile:
- Body material ---------- Steel, HF-1
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- TNT 23.8 lb

Components:
- Propelling charge ---------- M3A1 and M4A2 M119, M119A1, M119A2, M203, M203A1
- *Trilateral cartridges --------- 1, 2, 3

Primer:
- M82 ---------- for M126A1, M185, M199 Cannons
- MK2A4 ---------- for M1A2 Cannon
- Fuze (PD) ---------- M557, M739 Series
- (MTSQ) ---------- M564, M582 Series
- (Prox.) ---------- M732
- (ET) ---------- M767

Performance:
- Range:
  - Maximum ---------- 22 to 24 kilometers (M198 Howitzer)
  - Minimum (indirect fire) --- 1800 to 2800 meters at 200 mils quadrant 2600 to 3600 meters at high angle

Propellant Muzzle Velocity (M185/M199 Cannon):

M3A1 (3 thru 5)	863 to 1178 fps	263 to 441 mps
M4A2 (3 thru 7)	975 to 1795 fps	297 to 547 mps
M119/A1/A2 M203/A1	2135 fps 2630 fps	651 mps 802 mps
Trilateral Cartridge 1 (Zone 1-2)	830 fps	253 mps (Zone 2 only)
Trilateral Cartridge 2 (Zone 3-7)	938 to 2190 fps	288 to 668 mps
Trilateral Cartridge 3 (Zone 8)	2630 fps	802 mps

Weapon/Ammunition Combinations for M795 Projectile:

WEAPON	FUZES	PROP CHARGE
M198, FH70, SP70	PD-M739 Series M557 MTSQ-M564, M582 Series Prox-M732	M3A1, M4A2, M119 Series, M203, *Trilateral Cartridge 1,2,3
M109A1/A2/A3	Same as above	M3A1, M4A2, M119 Series *Trilateral Cartridge 1 and 2
M109/M114A2	Same as above	M3A1, M4A2

*NOTE: These Trilateral Cartridges provide a zoning solution for the Trilateral (Federal Republic of Germany, United Kingdom, and Italy) FH 70 and SP 70 Howitzers. This zoning solution is designed to give velocity levels which are equivalent at appropriate zones to the United States propelling charges.

Temperature Limits:

Firing:
- Lower limit ---------- -50°F
- Upper limit ---------- +145°F

Storage:
- Lower limit ---------- -65°F for periods of not more than 3 days
- Upper limit ---------- +160°F for not more than 4 hours per day
- *Packing ---------- 8 projectiles per pallet

Pallet:
- Weight w/projectile ---------- 865 lb
- Dimensions ---------- 29-1/8 x 14-5/8 x 36-1/2 in.
- Cube ---------- 9.0 cubic feet

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

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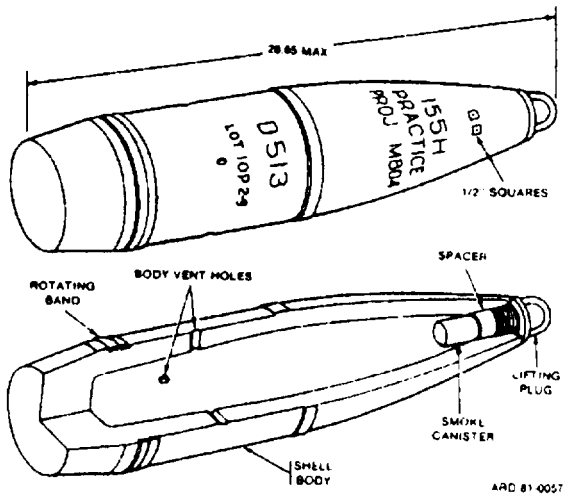
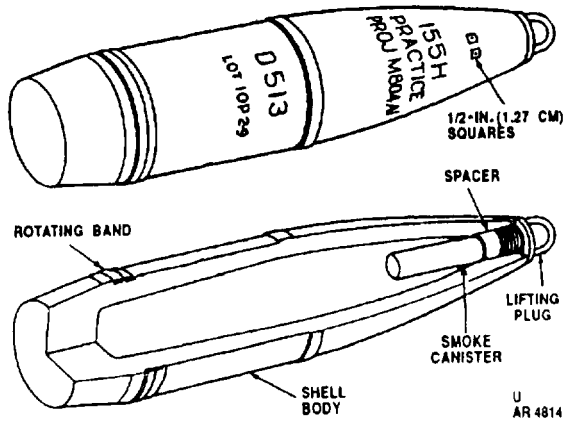
PROJECTILE, 155 MILLIMETER: PRACTICE, M804 AND M804A1





Type Classification:

M804: Standard MSR 01816002.
M804A1: Standard: dtd December 91

Use:

The 155mm, M804/M804A1 projectile is used in place of the M107, HE projectile for training in indirect fire of 155mnl howitzers. The M804/M804A1 projectile contains a smoke canister in the fuze well, which provides for a visual determination of functioning. It can be used in training at less cost than an M107 projectile, without the blast and fragmentation which accompany functioning of an M107.

Description:

The M804/M804A1 is similar in weight and external configuration to the M107 HE projectile. The body of the projectile is a thick walled hollow steel shell, which contains no filler. A smoke canister, which has the same external appearance as a supplementary charge, is contained in the deep fuze cavity. A threaded lifting plug closes the fuze cavity at the nose of the projectile for handling and storage. A rotating band encircles the shell casing near the base and a steel base plate is welded over the base to prevent entry of propellant gases into the interior. The rotating band is protected during shipping and handling by a plastic grommet installed at the time of manufacture.

Functioning:

The projectile fitted with a PD, MTSQ, or PROX fuze is loaded into the weapon with propelling charge and primer. When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy rotating band engages the barrel rifling to impart spin to the projectile for flight stability. Fuze functioning detonates the smoke canister. The flash and smoke escape, producing a visual as well as audible report. This enables the observer to spot the location of the projectile functioning.

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Difference Between Models:

The smoke canister in the M804 is smaller (195 g smoke composition) and is contained in an aluminum liner. The smoke canister in the M804A1 is larger (495 g smoke composition) and is contained in a steel cup. In addition, the smoke canister in the M804A1 contains an explosive 20 g pellet.

The body of the M804 contains four holes, 90 degrees apart, whereas the M804A1 doesn't have any.

For storage, handling, and transportation the M804A1 must have the cover support over the lifting plug to prevent the rub off action from the pallet cover.

Tabulated Data:

WEIGHT ZONES
Loaded Projectile (w/o fuze, w/o plug)

Zone	Pounds Over	Up to & Incl	Marking
2	90.0	91.3	
3	91.1	92.4	
4	92.0	93.7	
5	93.3	94.6	

Complete round:
- Type: Practice
- Length w/lifting plug: 26.85 in. max
- Length w/o lifting plug: 23.80 in. max
- Cannon used with: M1, M1A1, M1A2, M45, M126, M126A1, M185, M199, M284

Projectile: M804
- Body material: Forged steel
- Color: Blue w/white marking and brown band

Projectile: M804A1
- Body material: Cast iron
- Color: Blue w/white marking and yellow band

Smoke Canister:
- M804:
  - Length: 2.57 in.
  - Diameter: 1.79 in.
  - Weight: 0.43 lb
  - Filler: weight: 190 g (smoke comp)
- M804A1:
  - Length: 6.51 in.
  - Diameter: 1.75 in. max
  - Weight: 0.43 lb
  - Filler: weight: 450 g (smoke comp)

Canister Composition for M804 and M804A1:
- Zinc dust: 40%
- Potassium perchlorate: 20%
- Potassium nitrate: 20%
- Aluminum (Atomized): 20%

Pellet Assembly: M804A1
- Length: 0.53 in. max
- Diameter: 1.730 in. max
- Explosive:
  - Weight: 20 g
- Marking (Black):

THIS END UP
CANISTER, SMOKE
SW-522 SW-522 SW-522
FOR ARTILLERY PROJECTILE

Primers:
- For cannon:
  - M45, M126, M126A1, M199, M185, and M284: M82
  - M1, M1A1, M1A2: MK2A4
- Weapons: M198, M109, M109A1, M109A2, M109A3, M109A4, M109A5, M109A6, M114A1, M114A2

Propelling charges: M3 Series, M4 Series, M119 Series

Fuzes: PD: M557, M739 Series, MTSQ: M564, M582 , PROX: M732 only with the M804, ET: M767

Temperature Limits:

Firing:
- Lower limit: -60°F (-51°C)
- Upper limit: +145°F (+62.8°C)

Storage:
- Lower limit: -80°F (-62.2°C) (for periods not more than 3 days)
- Upper limit: +160°F (+71.1°C) (for periods not more than 4 hr/day)

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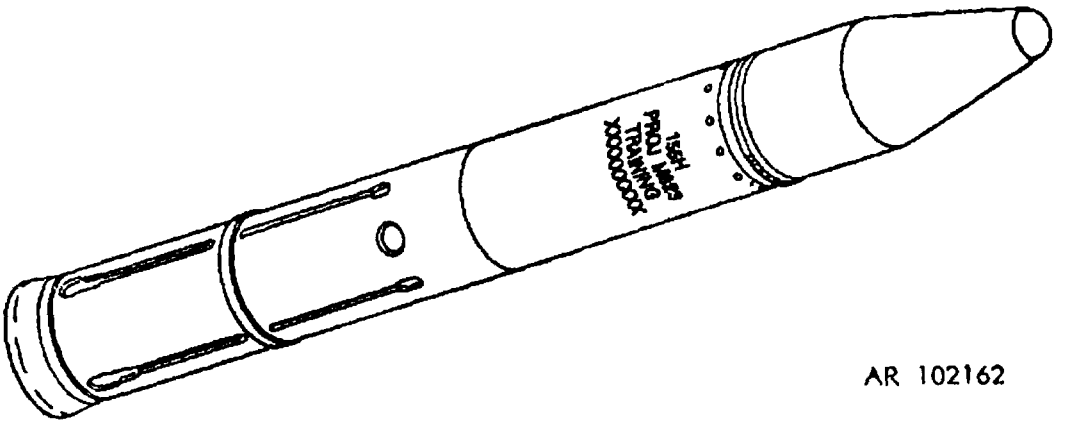
PROJECTILE, 155 MILLIMETER: TRAINING, M823



Type Classification:

STD MSR 11796005.

Use:

The projectile, 155mm: Training, M823 is an inert round which is not to be fired from the howitzer. It is designed to train the 155mm Howitzer weapon crews in handling the Cannon Launched Guided Projectile M712 (Copperhead) at crew level.

Description:

The training projectile M823 simulates the M712 in weight, center of gravity and external appearance. The M823 projectile consists of the following components:

a. The M712 projectile ogive (nose cone).

b. The M712 closure plug modified for easy removal and reassembly in connection with obturator replacement.

c. The plastic M712-type obturator.

d. A one-piece body assembly with five M712-type code and time switches mounted in a bracket located in the forward bourrelet. It also simulates, in appearance, the recessed fins and wings of the M712 round.

This projectile provides crew training in unpacking and repacking, setting the required time and code, ramming and extraction of the tactical projectile.

Provisions have been made to replace the obturator (should it become damaged from repeated use) by removing the projectile aft closure. In addition, the plastic nose cone on the training projectile can be replaced if it becomes damaged or broken. The switch bracket with five code and time switches is also easily replaceable.

Functioning:

The training round M823 contains no explosive. It is designed to be reusable with little maintenance and is used for training the 155mm howitzer crew in the operation of the live M712 projectile. The procedures are as follows:

a. The projectile is unpackaged and inspected.

b. The code and time switches are set.

c. The projectile is rammed into the howitzer tube.

d. The projectile is extracted from the howitzer tube.

e. The projectile is repacked.

This training round simulates the M712 in all artillery unit activities except that no propellant charges or other hazardous materials shall he used in training exercises with this item.

The Extractor:

The extractor tool is used to extract the projectiles M712 and M823 from the cannon tubes in Howitzers M109A1/A2IA3, M114A2, and the Ml 98. These howitzers have the cannon tubes M185, M1A2, and M199, respectively.

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The extractor tool consists of a two-piece adjustable screw driven rod. An expansion ring on one end is designed to snap and lock into the base of the projectile. A ratchet driven drive nut is located on the opposite end of the rod just to the rear of a T-Bar striker which is designed to fit against the rear face of a 155mm breech. A ratchet is provided to turn the drive nut. In use, the tool is extended and inserted in the open chamber of a 155mm howitzer through the weapon breech until the forward end makes contact with the projectile base. The projectile is engaged and locked by a plying forward pressure to the extractor tool. The extractor drive nut is then turned by hand until the striker bar is against the breech ring face. The ratchet tool is then inserted in the drive nut and turned until the projectile is pulled free.

Tabulated Data:

Projectile:

Type	Inert (training)
Weight	138 lb
Length	54.0 in.
Outside diameter	6.1 in. (155mm)
Body material	Aluminum
Color	Bronze w/black markings

Weapon System Information:

Weapon Type Cannon Tube
M109A1/A2/A3-SP-M185
M198-Towed-M199
M114A2-Towed-M1A2

Charge propelling	N/A
Fuze	N/A
Firing temperature	N/A

*Packing:
One projectile per container; six containers per pallet (when delivered in quantity).

Container:

Weight:	
w/projectile	205.5 lb
w/o projectile	67.5 lb
Length	61 in.
Width	11 in.
Height	11.375 in.
Cube	4.4 cu ft
Color	Forest green w/white markings
Pallet (unit load with contained projectiles and dunnage)	1358 lb
Length	61 in.
Width	33 in.
Height	27.5 in.
Cube	32 cu ft
DOT designation	PROJECTILE - NON-EXPLOSIVE
DODAC	1320 - D511
Drawing No.	
Projectile	9329721
Extractor	9305465
Container	9300440

*NOTE: Both the M712 and the M823 projectiles use the same container and pallet. However, the markings on the containers differ as follows: The container for the M712 projectile is painted forest green with yellow markings.

The container for the M823 projectile is painted forest green with bronze patches and white markings.

See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Limitations:

The M823 Training Projectile is not to be fired from a weapon. Such firing could be a hazard to personnel forward of the howitzer.

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-1025-211-10
TM 9-1025-200-12&P

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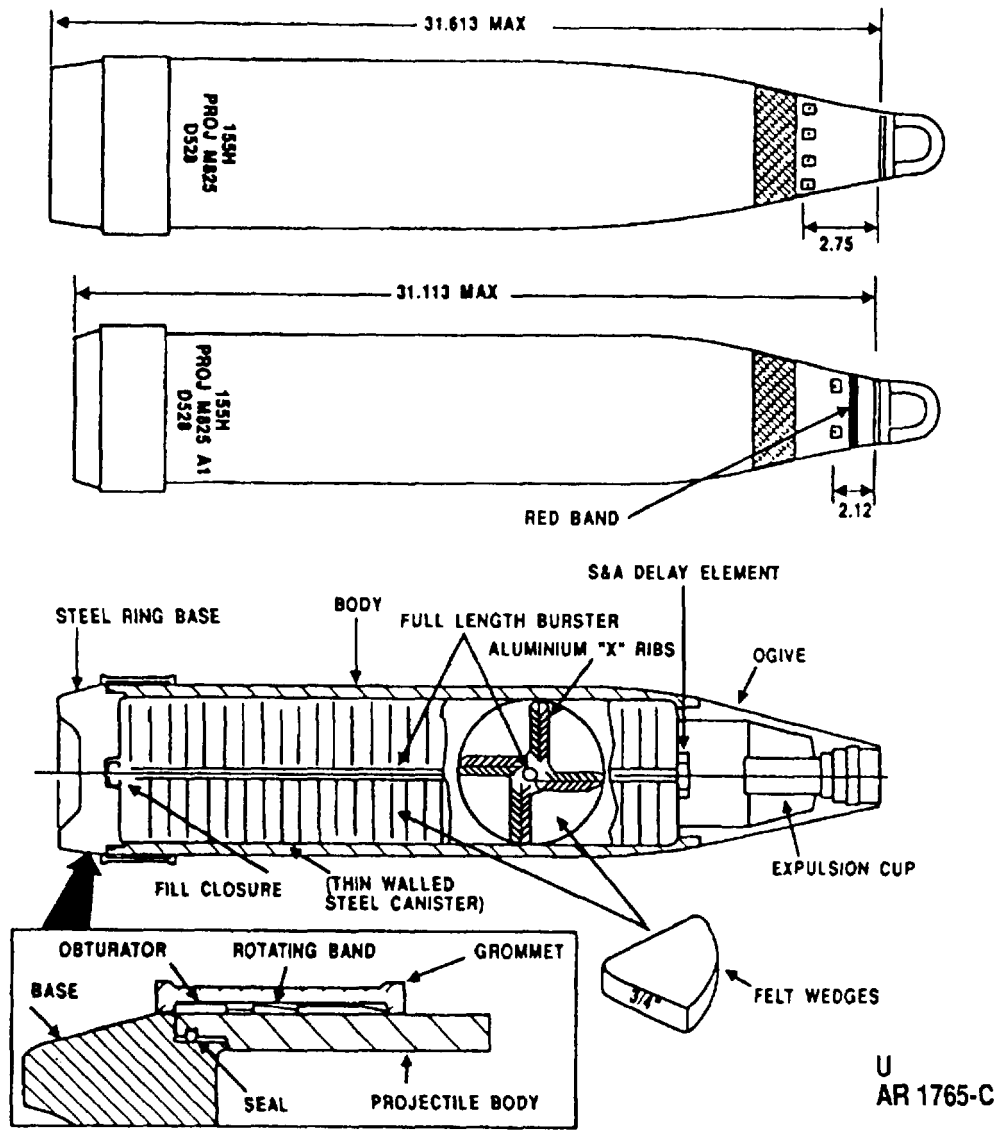
PROJECTILE, 155 MILIMETER: SMOKE, WP, M825 AND M825A1



Type Classification:

M825: Std, MSR 01836014, dtd 1983.
M825A1: Std

Use:

The M825/M825A1 smoke projectile is used by the artillery to produce screening smoke to obscure enemy vision or to screen maneuvering elements.

Description:

These projectiles are separate loading 155mm artillery projectiles which are used to produce a ground screening smoke of 5-10 minutes duration. The M825/M825A1 projectile consists of a modified M483A1 projectile carrier consisting of an M483A1 ogive and expulsion charge in a modified M483A1 all steel body and a threaded steel ring base. A rotating band encircles the assembled projectile near the base. The projectile carries a payload of white phosphorus impregnated 3/4-inch felt wedges contained in a hermetically sealed steel canister (29 per quadrant, 116 per canister). A burster charge, 1/4-inch diameter (approximately 21 grams Composition A-5) runs the entire length of the canister in the 1/2-inch x 1/2-inch central cavity which was produced by off-setting the canister X ribs. A launch activated safe and arm (S&A) module from the MTSQ M577 Series or ET M762 fuze separates the forward end of the main charge from the heat sensitive pyrotechnic delay equipment.

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Difference Between Models:

The M825A1 projectile contains an improved payload and a new base which have corrected the M825 flight instability.

The M825A1 base is made out of steel and has two wrench slots. The M825 base is made out of aluminum and has recesses for wrench.

For storage in the M109 series howitzer bustle rack, a provided spacer with solid top must be used.

Function:

When the weapon is fired, the flash from the primer ignites the propelling charge. The obturator and rotating band form a seal to prevent leakage of gas pressure past the projectile. The burning of the propelling char e generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. In-flight functioning of the mechanical time fuze ignites the expulsion charge causing ejection of the smoke payload. The 100 MS delay is activated by the burning expulsion charge and provides ample time for the canister to clear the projectile body before the main charge functions rupturing the canister and igniting the smoke payload. The multiple burning wedges fall to the target area and produce obscuring smoke (125-250 meters wide) lasting 5-10 minutes.

Tabulated Data:

Projectile:	
Type	Smoke, WP
Weight	102.6 lb
Length w/fuze:	
M825	35.4 in.
M825A1	34.9 in.
Body material	Forged steel/aluminum
Color:	
M825	Light green w/yellow band and light red markings
M825A1	Similar to M825 and a red band near top of projectile
Filler and weight	116 felt submunitions saturated with 12.75 lb of white phosphorus
Burster	Composition A-5, 21.2 g
Expulsion charge	M10 propellant, 51 g
Components:	
Propelling charges	M3 series, M4 series, M119, M119A1, M119A2, M203, and M203A1
Primer	Percussion, M82, (Percussion, MK2A4 for M114A2 weapon only)
Fuze	MTSQ M577 Series and ET M762
Weapon (cannon) used with	M114A2, (M1A2), M109 (M126A1), M109A1, M109A2, M109A3, M109A4 (M185), M109A5, M109A6 (M284) and M198 (M199)

Temperature Limits:

Firing:	
Lower limit	-50°F (-46°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (+73.9°C)

M825 projectiles (manufactured Jan 85 - May 86) fired at temperatures above +110°F (+43°C) (WP liquified) have resulted in flight instability and short rounds. This instability does not occur below +110°F (+43°C) (WP solid). This restriction does not apply to M825A1 projectile.

*Packaging	Eight projectiles on a pallet.
*Pallet:	
Weight	874 lb
Dimensions	39-3/8 x 29 x 14-1/2 in.
Cube	9.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

A pallet insert is necessary to support the base of each M825A1 projectile while on the pallet. These inserts are considered part of the pal-

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Howitzer, Towed, M198 (M199 Cannon):

Charge	Muzzle velocity (mps)	Max range (ml)
7WB. M4A2	550	17180
8WB, M119A1	671	22000
7RB, M119A2	671	22000
8R, M203	807	28180
8S, M203A1	807	28180

Howitzer, Self-Propelled M109A5/A6 (M284 Cannon):

Charge	Muzzle velocity (mps)	Max range (m)
7WB, M4A2	546	17000
8WB, M119A1	664	21830
7RB, M119A2	664	21830
8R, M203	798	27740
8S, M203A1	798	27740

Limitations:

Do not fire the M864 if the obturator is missing or broken because it may result in a short round. If the band is displaced and can be repositioned and remain in the groove, the projectile can be fired.

Do not fire the M864 projectile below charge 3. Firing below charge 3 may result in stickers.

The M864 will be fired with M203 series charge only in the M284 and M119 cannons. M203 series charge 8 is not equivalent to M119/M119A1 charge 8.

The M864 will be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available.

A 5000-meter safety zone is required short of the target because of the possibility of the base burner assembly nonignition.

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1025-211-10
TM 9-2350-311-10
TM 9-2350-314-10
TM 43-0001-28-6
TM 43-0001-28-7
TM 43-0001-28-8

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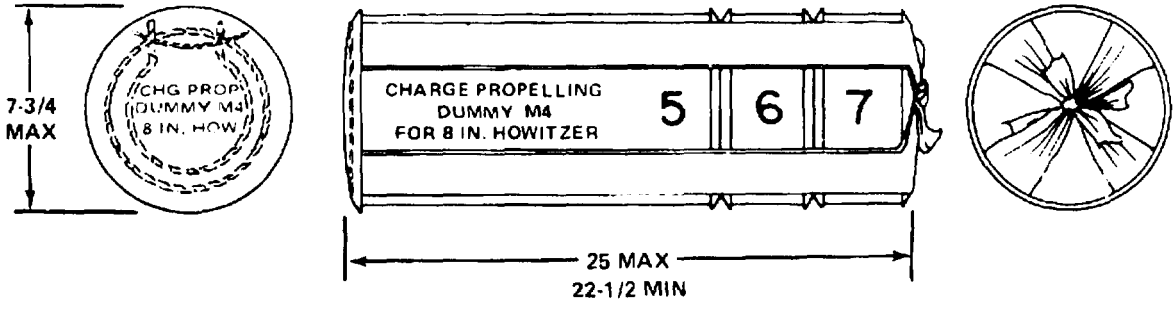
PROJECTILE, 8-INCH: DUMMY, M14 WITH CHARGE, PROPELLING: DUMMY, M4



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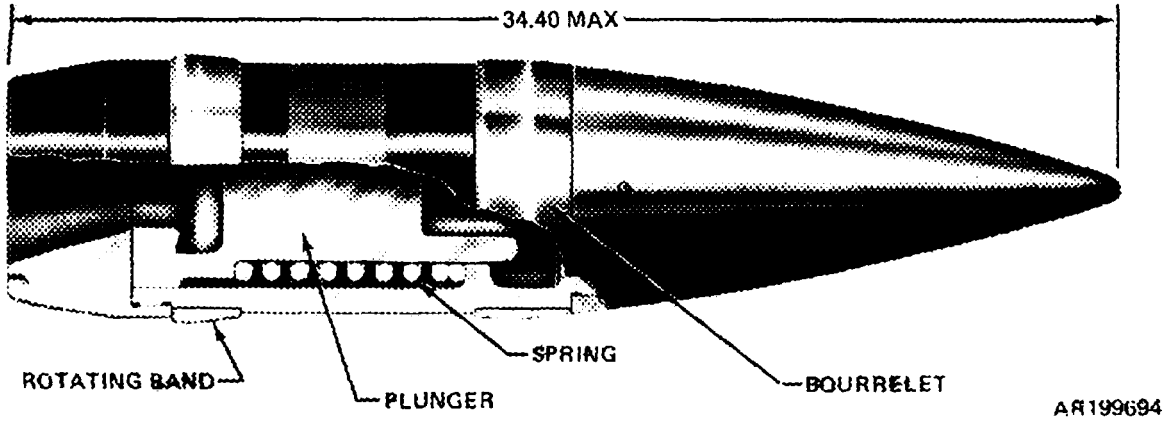

AR199694

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Dummy Projectile M14 and Dummy Propelling Charge M4 are used together as a drill round to train troops in handling 8-inch ammunition and loading 8-inch howitzers.

Description:

The dummy projectile simulates the standard HE Projectile M106 in exterior shape, weight, and center of gravity. A spring-loaded plunger in the base loosens the projectile in the forcing cone of the barrel by rebound impact after ramming. A bronze rotating band encircles the steel body just forward of the boattail, and a bronze bourrelet is fitted just behind the nose cone. Dummy Propelling Charge M4 simulates white bag Service Charge M2. The dummy base charge and two increments are filled with wood blocks, weighted with lead to equal the weight of the service charge.

Functioning:

Both Dummy Projectile M14 and Dummy Propelling Charge M4 are inert and do not function. During ramming of the projectile, the internal plunger is driven forward against the plunger spring. On rebound, the plunger impacts the base to loosen the tight fit in the forcing cone resulting from ramming. The purpose of the mechanism is to ease the extraction of the projectile. Actual extraction is accomplished by manual pulling, using Extractor M7 from the breech of the weapon to engage the base of the projectile.

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Tabulated Data:

Complete round:
- Type ---------- Inert
- Weight:
  - Projectile ---------- 200 lb
  - Prop. Charge ---------- 30 lb
- Length:
  - Projectile ---------- 34.40 in. max
  - Prop. Charge ---------- 25 in. max
- Cannon used with ---------- M2, M2A1, M2A2 (M2A1E1), M47 and XM201
- Projectile body material ----- Steel
- Charge M4 body material---- Lead - weighted wooden blocks, fabric covered
- Color:
  - Projectile (early mfg) ------ Black or blue w/white markings
  - Projectile (recent mfg) ---- Bronze w/white markings
  - Prop. Charge M4 ---------- White

Temperature Limits:

*Packing:
- Dummy Projectile M14 ------ 1 projectile in wooden crate
- Dummy Charge M4 ---------- 1 charge in wooden box

*Crate
- Weight ---------- 235 lb
- Dimensions ---------- 39-11/16 x 10-13/16 x 10-13/16 in.
- Cube ---------- 2.4 cu ft

*Packing box (Prop charge):
- Weight ---------- 51.9 lb
- Dimensions ---------- 29-9/32 x 9-13/16 x 8-7/32 in.
- Cube ---------- 1.6 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOT designation:
- Dummy Projectile M14 ------ PROJECTILE NONEXPLOSIVE
- Dummy Charge M4 ---------- DUMMY PROPELLING CHARGE

DODAC:
- M14 ---------- 1320-D679
- M4 ---------- 1320-D677

Assembly drawing number.:
- M14 ---------- 72-1-82
- M4 ---------- 8863354

Ballistics:

Not applicable.

References:

TM 9-2300-216-10
SB 700-20
AMC-P 700-3-3

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M201 Cannon (M110A1 SP Weapon):

	Muzzle velocity	Rocket Off	Rocket On	Chamber pressure
Ml, Green bag				
Charge1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
M188, White bag				
Charge 8				

M201E1 Cannon (M110A2 SP Howitzer):

	Muzzle velocity	Maximum Range Rocket Off	Rocket On	Chamber pressure
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
188, White bag				
Charge 8				
M188E1, White bag				
Charge 8				
Charge 9				

Limitations:

None.

References:

TM 9-1300-251-20
TM 9-1300-251-34
AMC-P 700-3-3
SB 700-20
TM 9-2300-216-10

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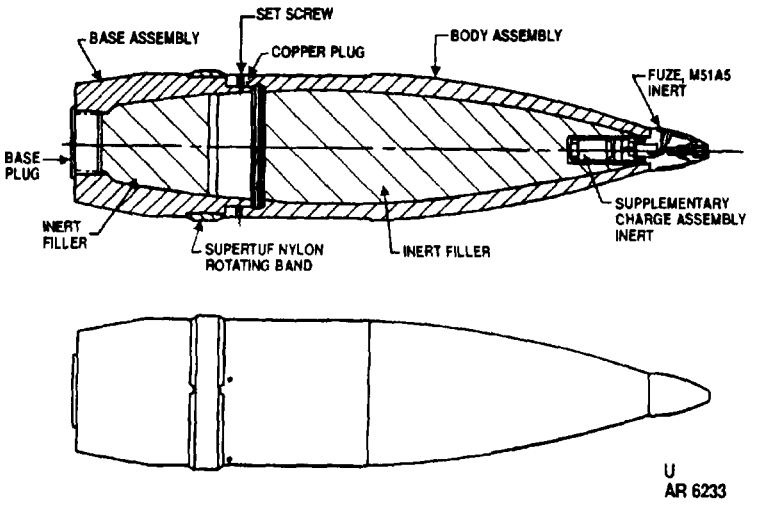
PROJECTILE, 8-INCH: DUMMY, M845



Type Classification:

Std MSR 09806005,

Use:

The M845 projectile is designed to provide the operator/crew with an inert training projectile which can be used to develop and maintain operator/crew proficiency in the proper operation and maintenance of the loader rammer system on 8-inch, Self-Propelled, M11OA2 Howitzers, in other than live fire situations. The M845 projectile is designed to provide training in handling, loading, and ramming and extraction of 8-inch ammunition; it is not to be fired.

Description:

The M845 simulates the standard 8-inch: HE, M106 projectile in exterior shape and weight. It consists of a steel ogive and body section which is threaded to a steel base and boattail section. The forward body/ogive section is filled with approximately 35 pounds of inert materiel to bring the projectile up to weight. This section contains a threaded fuze cavity at the nose end which is fitted with an inert supplemen-tary charge and a lifting plug. The base-section is fitted with a replaceable plastic rotating band at its forward end and a threaded cut-out to facilitate extraction from the breech at the base end, It is fitted with inert materiel to bring it to the required weight. The base section threads to the forward body section with a junction formed where the body meets the rotating band seat. Once the two sections are threaded together and firmly seated, their position is fixed by insertion of four brass inserts which are held in place by setscrews. The M845 is used with an inert M51 Series Fuze which threads into the fuze cavity after removal of the eyebolt lifting plug. The plastic rotating band is protected by a removable grommet during shipping and handling.

Functioning:

After the projectile is unpacked, the eyebolt lifting plug is removed and an inert M51 series fuze is installed, (The projectile is shipped one per wooden packing box. In addition to the projectile, the packing box includes one inert M51 Series Fuze and one Rotating Band Replacement Kit.) The protective grommet is removed and the projectile is loaded into the weapon chamber using normal power loading and ramming procedures. After the projectile has been successfully rammed, it then can be extracted using either the bell rammer from the muzzle of the weapon or the H4277 Extracter through the breech of the weapon.

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NOTE

- Provided that the loader rammer is operating properly and the rotating band of the projectile has not exceeded its wear limit, the extraction force will be in excess of 2000 pounds. Wear limit for the rotating band is 100 rams after which it can be reversed and used for 100 additional rams. After the M845 has been rammed and extracted 200 times, the rotating band must be replaced.

- A separately issued rotating band kit (1320-01-112-2627) is available for requisition.

- Reasonable care should be used in handling the projectile to avoid damage to the rotating band. In extracting the projectile, the rammer tray and trough should be properly aligned. Improper alignment may result in the rear edge of the band catching at the junction of tray and trough and being nicked.

Tabulated Data:

Projectile:	
Type	Inert
Weight	200 lb (90.0 kg)
Length:	
w/o Lifting plug	31.43 in. (79.8 cm)
w/Lifting plug	34.35 in. (max) (87.2 cm)
w/M51 inert fuze	35.76 in. (90.8 cm)
Diameter:	
Rotating band OD	8.185 in. - 0.010 in. (20.8 cm)
Bourrelet	7.994 in. (max) (20.3 cm)
Body material	Steel
Color	Bronze w/black markings
Filler	Forward body section - Inert Type IV, Spec MIL-I-60350
Base	Inert, Type IV, Spec MIL-I-60350
Supplementary charge	Inert, filler, 0.30 lb, Spec MIL-I-60350 (MU)
Grommet	Plastic w/metal liner
Cannon used	M201A1
Fuze and type	M51A5, inert

Temperature Limits:

Use:	
Upper limit	+125°F (+52°C)
Lower limit	-40°F (-40°C)
Storage:	
Upper limit	+160°F (+71.1°C) for not more than 4 hr/day
Lower limit	-80°F (-62.2°C) for periods of not more than 3 days (-62.2°C)

Packing Data:

*Packing	1 ea M845 projectile w/1 ea inert M51A5 series fuze packed in wooden packing box
Drawing number	9340709
Pallet:	
Packing weight	261 lb (117.4 kg)
Dimensions	40-9/16 x 16-1/4 x 18-7/8 in. (103.0 x 41.3 x 47.9 cm)
Cube	7.2 cu ft (0.22 cm)

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	PROJECTILE, NONEXPLOSIVE
NSN-DODAC (M845 Proj.)	1320-D648
Drawing number	9335575
NSN (Rot. band replacement kit)	
Separate issue	1320-01-112-2627
Drawing number	9340711
Ballistics	N/A

Limitations:

N/A

References:

SB 700-20
AMC-P 700-3 3
TM 9-1100-218-10
TM 9-2350-304-10

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CHAPTER 4

AMMUNITION FOR MORTARS

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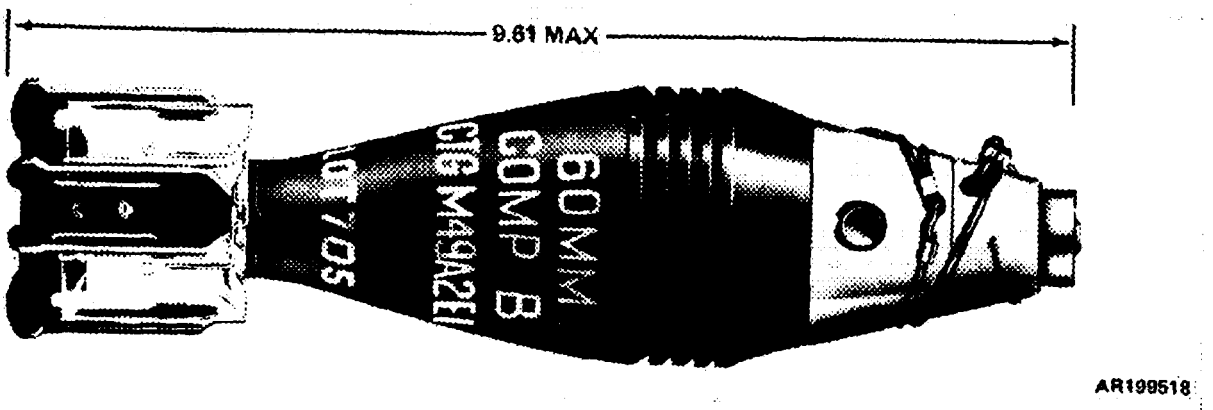
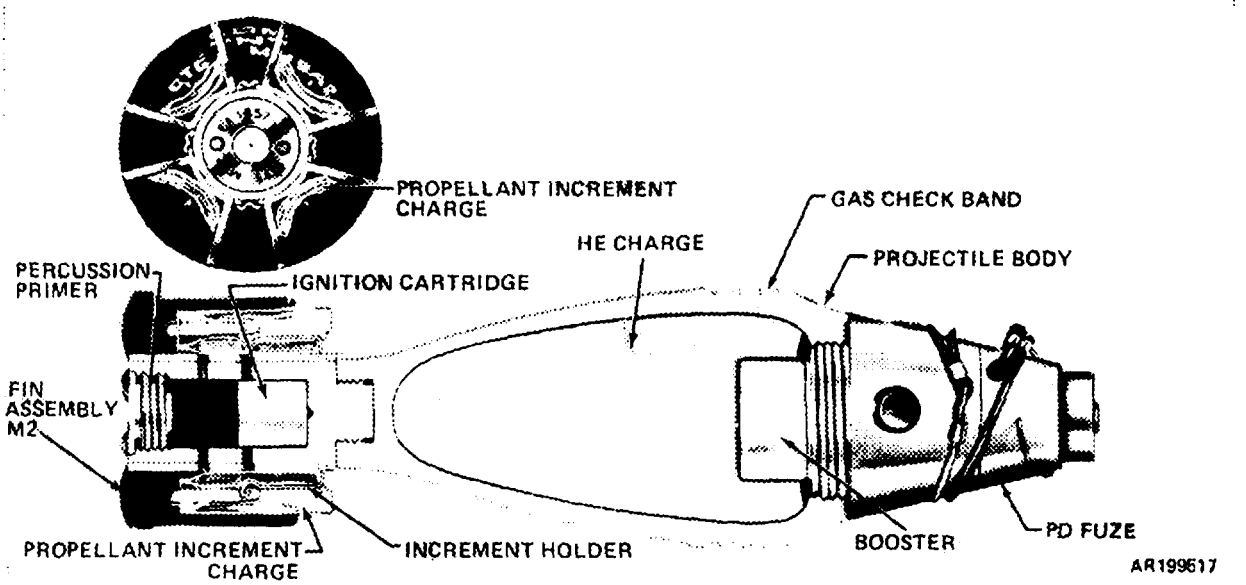
CARTRIDGE, 60 MILLIMETER: HE, M49A3 (M49A2E1) AND M49A2



AR199518



AR199617

Type Classification:

M49A3: Std AMCTC 6632, dtd 1969.
M49A2: Std OTCM 37119, dtd 1959.

Use:

This cartridge is fired in 60mm mortars M2 or M19 for use against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body a point-detonating fuze (staked), a fin assembly, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of pearlitic malleable iron (PMI), and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the high explosive charge. The high explosive charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

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Difference Between Models:

The projectile body of the M49A2 is of forged steel and is filled with flaked TNT.

Tabulated Data:

Complete round:
- Type ---------- HE
- Weight w/fuze ---------- 3.07 lb
- Length w/fuze ---------- 9.61 in.

Projectile:
- Body material:
  - M49A3 ---------- Cast PMI
  - M49A2 ---------- Forged steel
- Color ---------- Olive drab w/yellow markings
- Filler and weight:
  - M49A3 ---------- Comp B, 0.42 lb
  - M49A2 ---------- TNT, 0.34 lb

Components:
- Ignition cartridge ---------- M5A1
- Propellant charge ---------- M3A1
- Percussion primer ---------- M32
- Fin assembly ---------- M2
- Fuze ---------- PD, M525 series PD, M717

Temperature Limits:

Firing:
- Lower limit ---------- -40°F(-40°C)
- Upper limit ---------- +125°F (+51.7°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing: One round in fiber container, 10 containers in wooden box.

*Packing Box:
- Weight ---------- 49 lb
- Dimensions ---------- 17-9/16 x 12-1/8 x 8-7/32 in.
- Cube ---------- 1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0321
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1310-B632
- Drawing number ---------- 9207925

Ballistics:

Charge	Muzzle Velocity (fps)	Maximun Range (yd)	Maximun Range (m)
0*	189	332	303
1	292	784	716
2	377	1204	1101
3	449	1594	1458
4	518	1978	1809

*Charge O is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

Limitations:

Although this cartridge is safe for firing at standard temperatures, excessive pressure may develop at Charge 4 below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding one minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

References:

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

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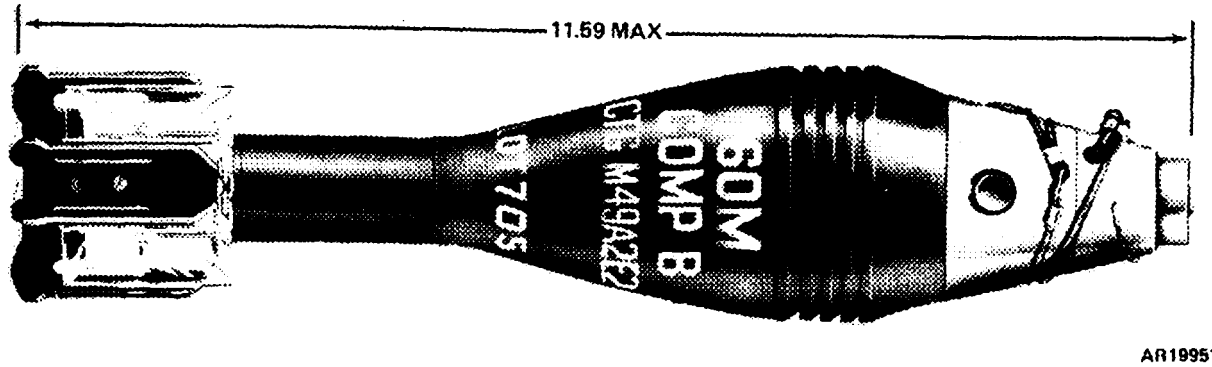
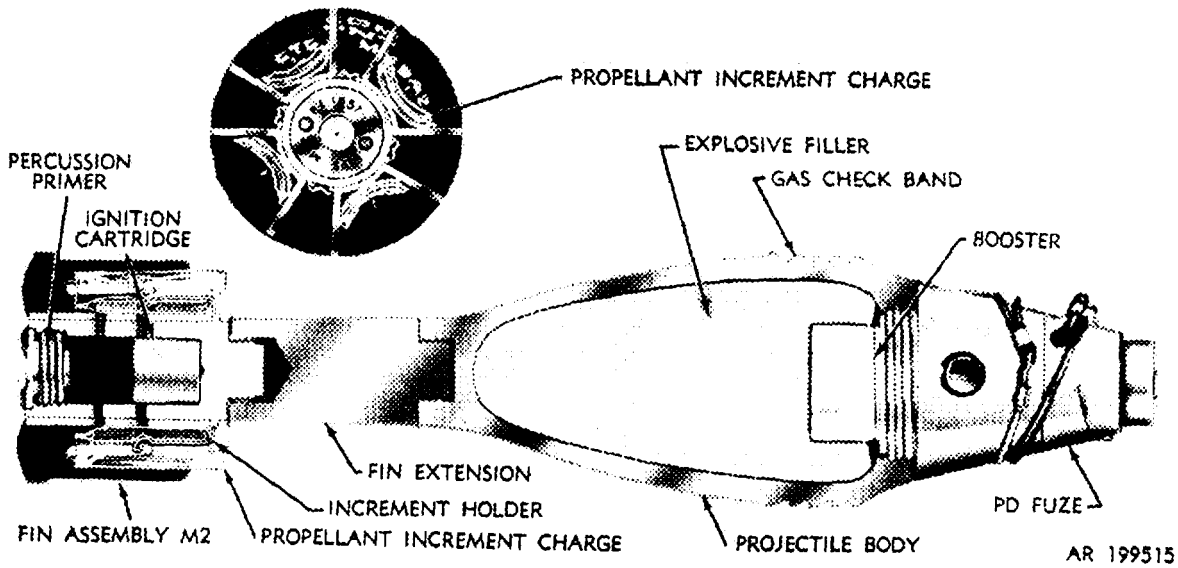
CARTRIDGE, 60 MILLIMETER: HE, M49A4 (M49A2E2)





Type Classification:

CON MSR 11756003 (M49A4)
OBS MSR 11756003 (M49A2)

Use:

This cartridge is fired in 60mm mortars M2 and M19 for use against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body a point-detonating fuze (staked), a fin assembly with a 2 inch extension! four increments of propellant charge, an Ignition cartridge, and a percussion primer. The projectile body is of forged steel or pearlitic malleable iron (PMI), and is threaded internally at the nose to accept the fuze and at the base to accept the fin extension. The body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propelling charge. Rapidly expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

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Tabulated Data:

Complete round:
- Type ---------- HE
- Weight w/fuze ---------- 3.25 lb
- Length w/fuze ---------- 11.59 in.

Projectile:
- Body material ---------- Forged steel or cast PMI
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 0.42 lb

Components:
- Ignition cartridge ---------- M5A2
- Propellant charge ---------- M181
- Percussion primer ---------- M32
- Fin assemby ---------- M2 plus extension
- Faze ---------- PD, M525 series; PD, M717; PD M935

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (-51.7°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- 1 round in fiber container; l2 containers in wooden box

*Packing Box:
- Weight ---------- 55.5 lb
- Dimensions ---------- 16-1/16 x 13-5/8 x 11-5/16 in.
- Cube ---------- 1.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0321
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1310-B632
- Drawing number ---------- 9220179

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1985	1814

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

References:

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

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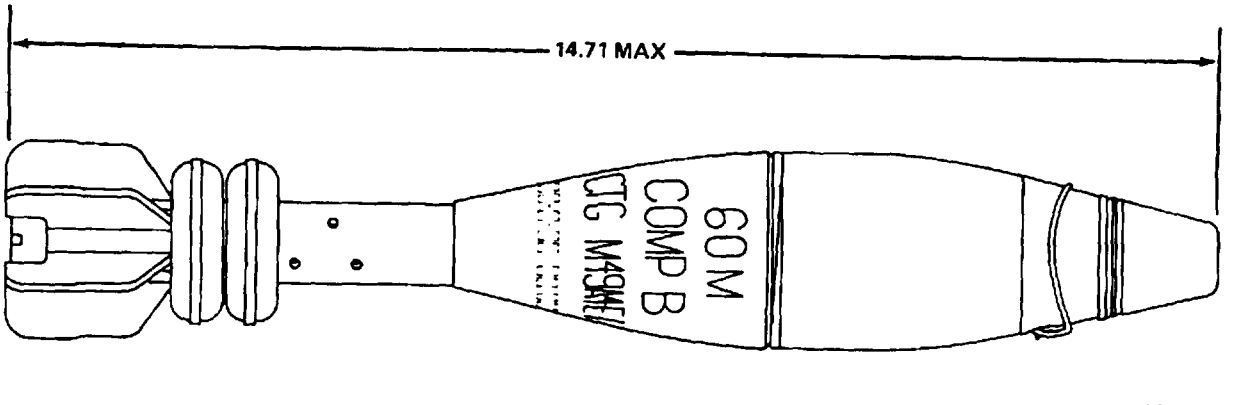
CARTRIDGE, 60 MILLIMETER: HE, M49A5 (M49A4E1)



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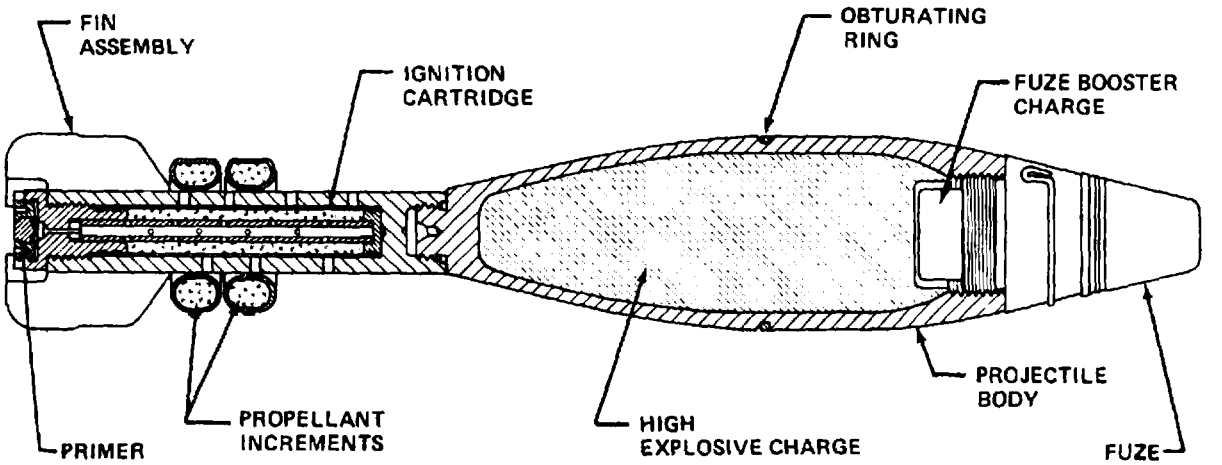

AR199513

Type Classification:

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fin assembly two increments of propellant charge, and an ignition cartridge with a percussion primer. The alloy steel projectile body is internally threaded at the nose to accept the fuze, externally threaded at the base to accept the fin assembly and grooved to hold the Delrin obturating ring. The body is loaded with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the projectile body producing near optimum fragmentation and blast effect at the target.

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Tabulated Data:

Complete round:	
Type	HE
Weight w/fuze	3.90 lb
Length w/fuze	14.71 in.
Cannon used with	M19
Projectile:	
Body material	Alloy steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 0.79 lb
Components:	
Ignition cartridge	M702
Propellant charge	M204
Percussion primer	M35
Fin assembly	M25
Fuze	PD, M935

Temperature Limits:

Firing:	
Lower limit	−40°F (-40°C)
Upper limit	+125 °F (+51.7°C)
Storage:	
Lower limit	-65°F (for period not more than 3 days) (-53.8°C)
Upper limit	+160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing	1 round in fiber container; 8 containers in metal box; 2 metal boxes in wirebound box
*Packing Box:	
Weight	100 lb
Dimensions	
Cube	2.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catolog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-
Drawing number	9241292

References:

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

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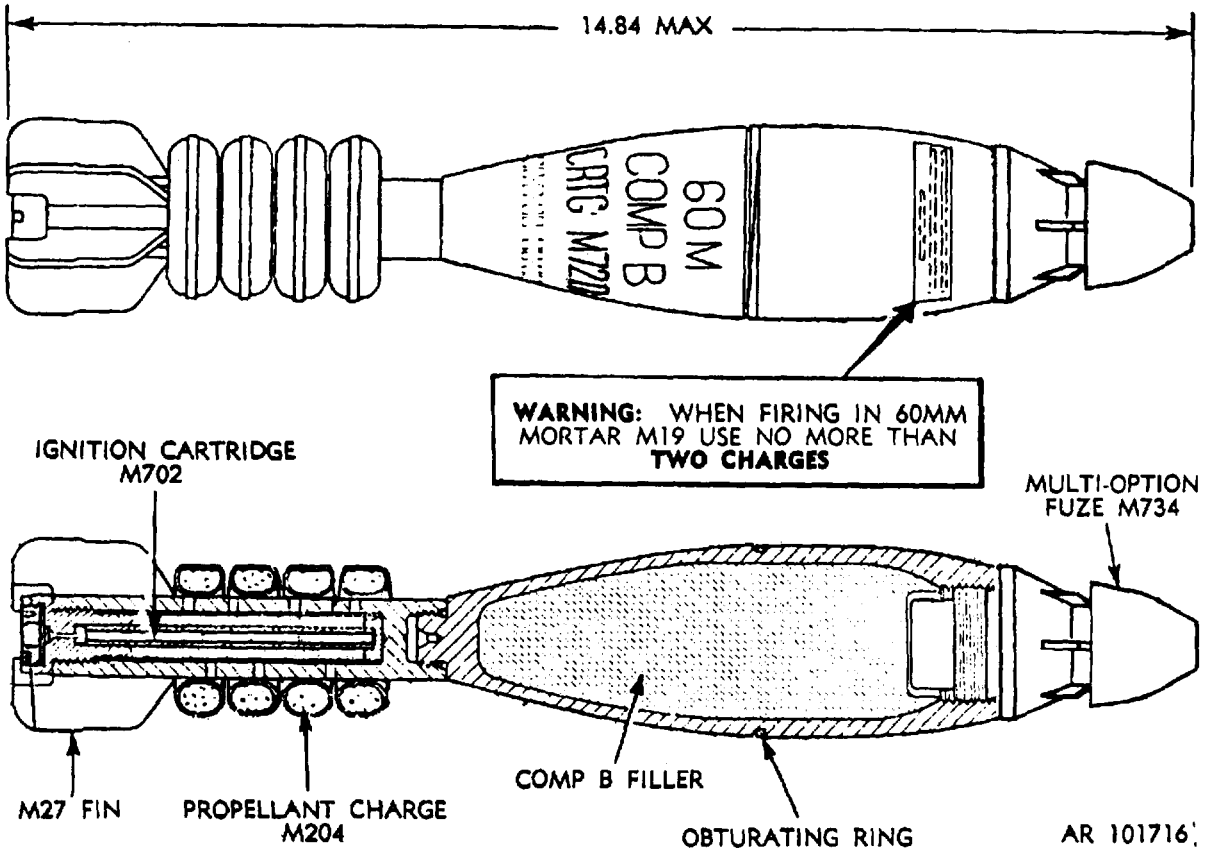
CARTRIDGE, 60 MILLIMETER: HE, M720



Type Classification:

Std MSR 01786006.

Use:

This cartridge is fired in the 60mm M224 mortar in the Lightweight Company System. It is used against troops (either in the open or in foxholes), light vehicles, light bunkers and similar targets.

Description:

The complete round consists of a projectile body, a multi-option fuze, a fin assembly four increments of propellant charge, ignition cartridge and obturating ring. The projectile body is of alloy steel and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube. The firing pin at the bottom of the tube initiates the primer. The flash from the primer ignites the ignition cartridge, which in turn ignites the propellant charge. Rapidly expanding gases from the burning propellant expand the obturating ring, accelerating the cartridge and propelling it in flight. Stabilization in flight is accomplished by aerodynamic and spin action of the fin assembly.

Tabulated Data:

Complete round:

Type	HE
Weight w/fuze	3.75 lb
Length w/fuze	14.84 in.
Cannon used with	M19, M224

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Projectile:
- Body material ---------- Alloy steel
- Color ---------- Olive drab
- Filler and weight ---------- Comp B 0.42 lb

Components:
- Ignition cartridge ---------- M702
- Propellant charge ---------- M204
- Percussion primer ---------- M35
- Fin assembly ---------- M27
- Faze ---------- Multi-Option M734

Temperature Limits:

Firing:
- Lower limit ---------- -50°F (-45.6°C)
- Upper limit ---------- +145°F (+62.8°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)(-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4hr/day) (+71.1°C)

*Packing ---------- 1 round in fiber container; 8 fiber containers in metal container; 2 metal containers in wirebound box

*Packing Box:
- Weight ---------- 112 lb
- Dimensions ---------- 14-15/16 x 13-3/16 x 17-3/4 in.
- Cube ---------- 2.1 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class ---------- (08) 1.2
Storage compatibility group ---- E
DOT shipping class ---------- A
DOT marking ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1310-B642
Drawing number ---------- 9275526

Ballistics:

Charge	Muzzle Velocity (fps)	Minimum Range (m)	Maximum Range (m)
0*	210	70	400
1	415	250	1340
2	560	350	2150
3	680	500	2890
4	810	650	3490

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one propellant charge; Charge 4 is the ignition cartridge and 4 propellant charges.

Limitations:

Do not tire the M720 cartridge in the M19 mortar above propellant charge 2.

Do not fire the M720 cartridge with charge greater than 1 in the hand held mode.

References:

FM 23-90
TM 9-1010-223-10
TM 9-1015-215-10
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-3071-1

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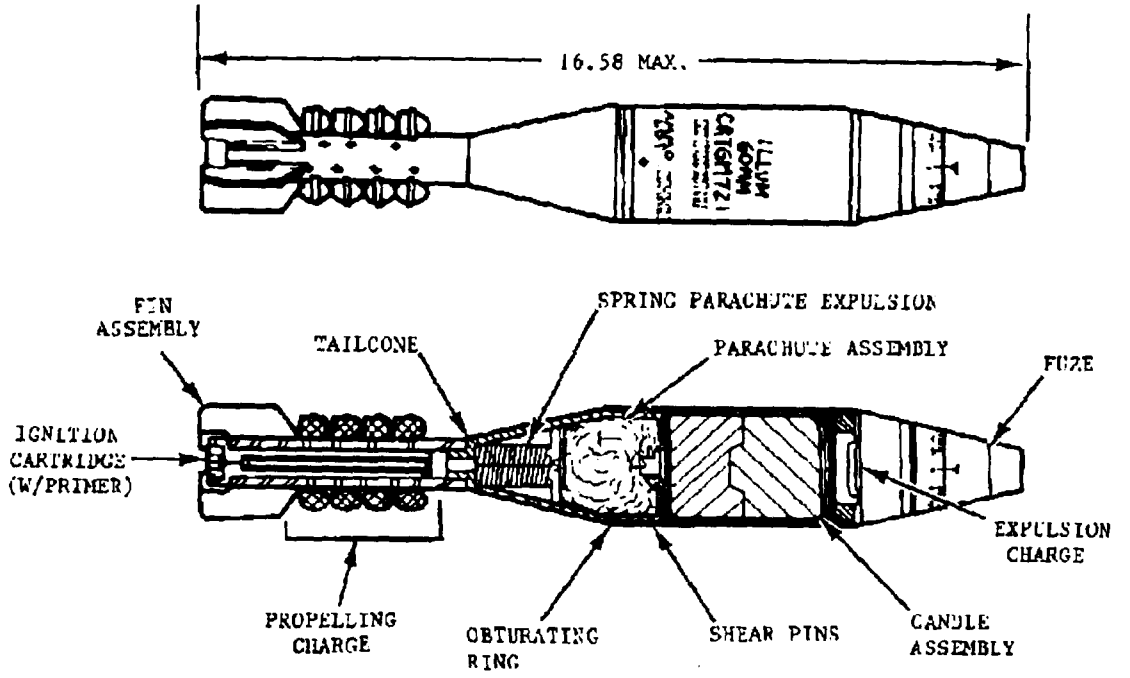
CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M721



AR 4022

Type Classification:

Std Sep '87

Use:

This cartridge is an illumination round for the 60mm M224 mortar and is used for laminating a desired point or area.

Description:

The cartridge has a mechanical time superquick fuze with an expulsion charge, a candle/parachute assembly a four increment propelling charge, and an ignition cartridge. The round provides 400,000 average candlepower illumination for about 40 seconds.

Functioning:

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. At a pre-set time the fuze functions in flight. The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.

Tabulated Data:

Complete Round:	
Type	Illumination
Weight	3.76 lb (1.71 kg)
Length	16.58 max.
Projectile:	
Material	
Color	White w/black markings
Filler	Illuminating
	Assembly
Components:	
Ignition cartridge	M702
Fin assembly	M27
Fuze	MTSQ, M776 (DM93)
Propelling charge	M204
Drawing number	9345338
Maximum range:	3490 m (11,450 ft)

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Temperature Limits:

Firing:	
Lower	-50°F (-45.6°C)
Upper	+145°F (+62.8°C)
Storage:	
Lower	-50°F (-45.6°C) for a period of not more than 3 days
Upper	+160°F (+71.1°C) for a period of not more than 4hr/day

Shipping and Storage Data:

UNO serial number	0171
DOD hazard class	(08) 1.2
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
*Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box.
*Packing Box:	
Weight	112 lb (50.80 kg)
Dimensions	14-15/16 x 13-3/16 x 20 in. (37.94 x 33.50 x 50.8 cm)
Cube	2.3 cu ft (0.07 cu m)
DODAC	1310-B647

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Limitations:

The M721 cartridge cannot be fired above Charge 2 in the M19 mortar. Do not fire below Charge 1.

References:

TM 9-1010-223-10
DOD Consolidated Ammunition Catalog AMC-P 700-3-3

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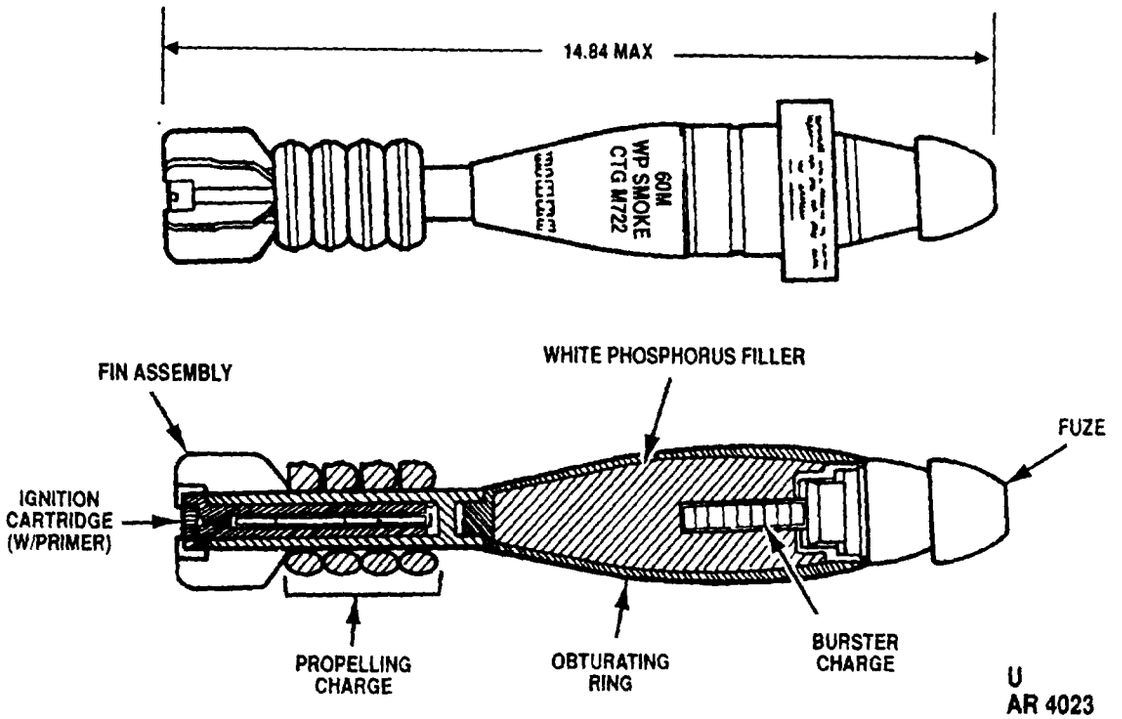
CARTRIDGE, 60 MILLIMETER: SMOKE (W), M722



Type Classification:

Std Oct '87

Use:

This cartridge is a smoke round for the 60mm M224 mortar and is used for spotting purposes.

Description:

The cartridge has a point-detonating fuze, a burster charge, white phosphorus (WP) filler, a thin walled shell, fin assembly, a four increment propelling charge, and an ignition cartridge.

Functioning

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. On impact, the fuze functions. The fuze initiates the burster charge. The burster charge ruptures shell and disperses the WP filler. The WP produces smoke upon exposure to the air.

Tabulated Data:

Complete Round:

Type	Smoke
Weight	3.75 lb (1.70 kg)
Length	14.84 in. (37.69 cm) max.

Projectile:

Material	Steel
Color	Light green w/red markings and one yellow band
Filler	White phosphorus

Components:

Ignition cartridge	M702
Fin assembly	M27
Fuze	PD M745
Propelling charge	M204
Drawing number	12902791
Maximum range	3490 m

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Temperature Limits:

Firing:	
Lower	-50°F (-45.6°C)
Upper	145°F (+62.°C)
Storage:	
Lower	-50°F (-45.5°C) for a period of not more than 3 days
Upper	+160°F (+71.1°C) for a period of not more than 4 hr/day

Shipping and Storage Data:

UNO serial number	0246
DOD hazard class	1.3
Storage compatibility group	H
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
*Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box
*Packing Box:	
Weight	112 lb
Dimensions	14-15/16 x 13-3/16 x 17-3/4 in. (37.94 x 33.50 x 45.09 cm)
Cube	2.0 cu ft (0.06 cu m)
DODAC	1310-B646

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Limitations:

The M722 cartridge cannot be fired above Charge 2 in the M19 mortar.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

TM 9-1010-223-10
DOD Consolidated Ammunition Catalog
AMC-P 700-3-3

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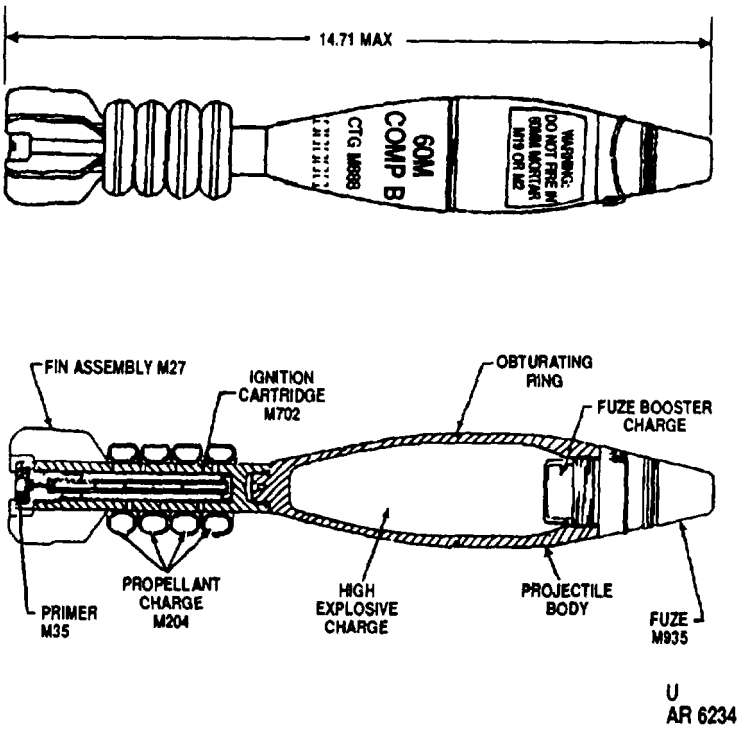
CARTRIDGE, 60 MILLIMETER: HE, M888



Type Classification:

Std LCC-A-MSR 04836008.

Use:

This cartridge is fired in the 60mm M224 mortar in the Light-weight Company System. It is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fin assembly, four increments of propellant charge, and an ignition cartridge with a percussion primer. The alloy steel projectile body is internally threaded at the nose to accept the fuze, externally threaded at the base to accept the fin assembly and grooved to hold the Delrin obturating ring. The body is loaded with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the propellant charge. Rapidly expanding gases from the burning propelant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive.

Tabulated data:

Complete round:	
Type	HE
Weight w/fuze	3.90 lb
Length w/fuze	14.71 in.
Cannon used	M224
Projectile:	
Body material	Alloy steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 0.79 lb
Components:	
Ignition cartridge	M702
Propellant charge	M204
Percussion primer	M35
Fin assembly	M27
Fuze	PD, M935

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Temperature Limits:

Firing:	
Lower limit	-50°F (-45.6°C)
Upper limit	+145°F (+62.8°C)
Storage:	
Lower limit	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4/hr day) (+71.1°C)
*Packing	1 round in fiber container; 8 fiber containers in metal box; 2 metal boxes in wirebound box
*Packing box:	
Weight	112 lb
Dimensions	14-15/16 x 13-3/16 in. x 17-3/4 in.
Cube	2.1 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B643
Drawing number	9354430

Limitations:

When firing in 60mm mortar M19 or M2 use no more than two (2) charges.

References:

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

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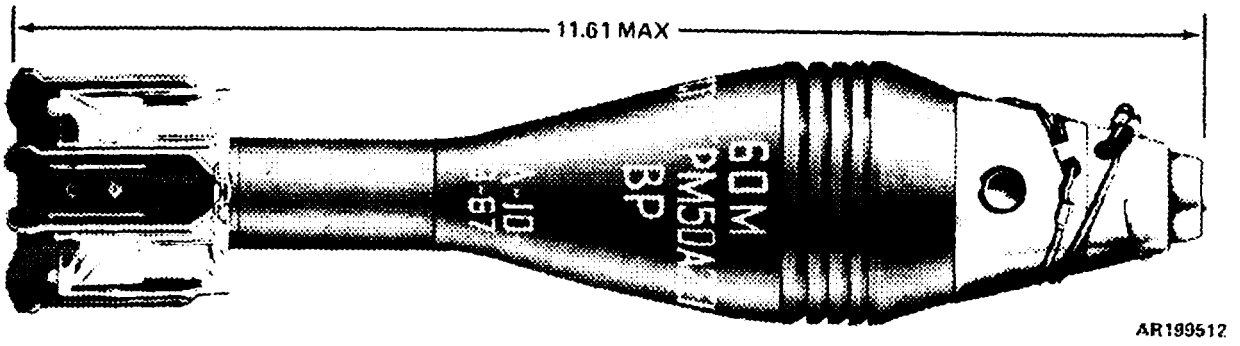
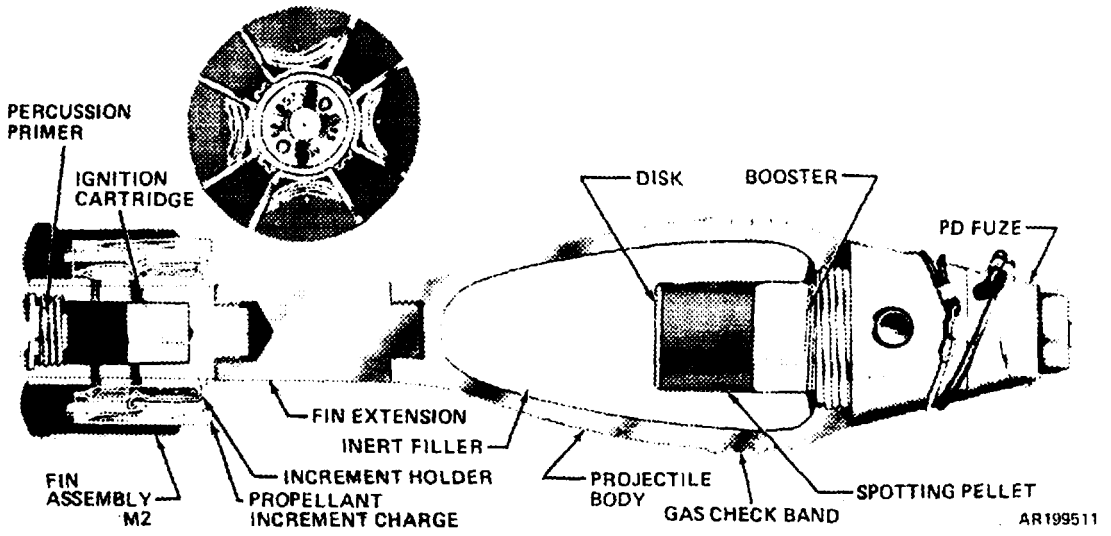
CARTRIDGE, 60 MILLIMETER: TARGET PRACTICE, M50A3 (M50A2E1)





Type Classification:

C & T AMCTC 6632, dtd 1969.

Use:

This cartridge is fired in 60mm mortars M2 and M19 for target practice and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly with a 2 inch extension, four increments of propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of forged steel or pearlitic malleable iron (PMI), and is threaded internally at the nose to accept the fuze and at the base to accept the fin extension. The body is loaded with an inert plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet of black powder for a spotting charge is loaded in a cavity just below the booster casing of the fuze.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and the spotting charge.

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Tabulated Data:

Complete round:
- Type ..... TP
- Weight w/fuze ..... 03.15 lb
- Length w/fuze ---------- 11.61 in.

Projectile:
- Body material ---------- Forged steel or cast PMI
- Color ---------- Blue w/white markings and brown band
- Filler and weight ---------- Inert, 0.29 lb
- Spotting charge ---------- Black powder, 0.55 lb

Components:
- Ignition cartridge ---------- M5A1
- Propellant charge ---------- M181
- Percussion primer ---------- M32
- Finassemby ---------- M2 plus extension
- Fuze ---------- PD, M525 series; PD, M935

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+51.7°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- 1 round in fiber container; 10 containers in wooden box

*Packing Box:
- Weight ---------- 49.0 lb
- Dimensions ---------- 17-9/16 x 12-1/8 x 8-7/32 in.
- Cube ---------- 1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class ---------- (08) 1.2
Storage compatibility group ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITHEXPLOSIVE PROJECTILES
DODAC ---------- 1310-B634
Drawing number ---------- 9220383

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1963	1814

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

References:

TM 9-3071-1
TM 9-1015-215-10

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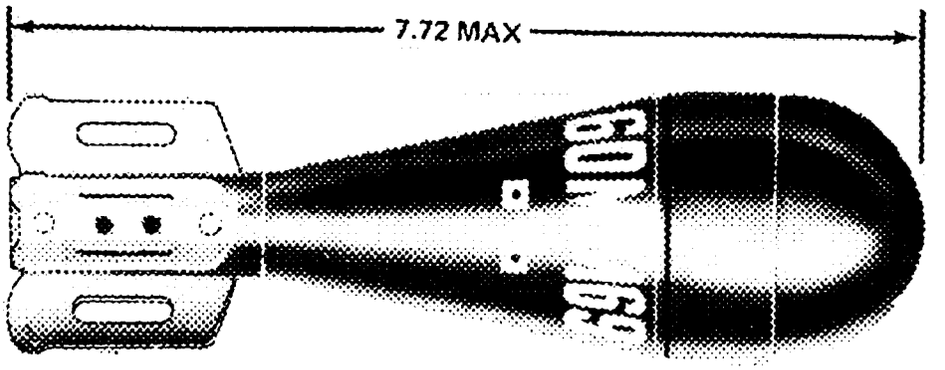
CARTRIDGE, 60 MILLIMETER: TRAINING, M69



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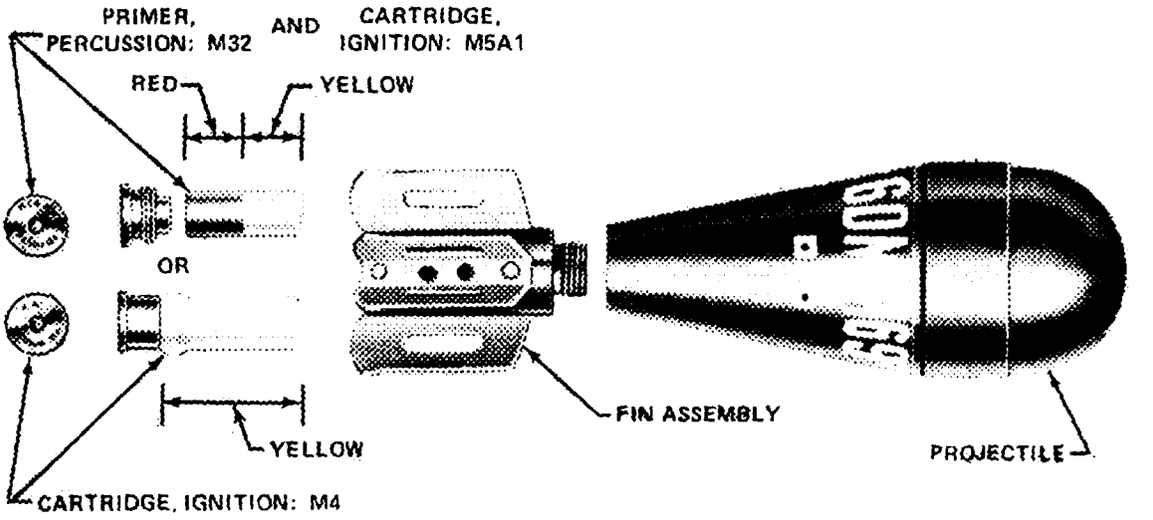

AR199509

Type Classification:

Std OTCM 37119, dtd 1959.

Use:

This cartridge is used for training in the loading and firing of 60mm mortars M2 and M19.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of an inert projectile, a fin assembly, an ignition cartridge, and a percussion primer. The pear-shaped, cast iron projectile has no provision for a fuze and is internally threaded at the base to accept the fin assembly.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer detonates the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Since the cartridge is inert, there is no detonation upon impact and the cartridge may be recovered for reuse.

Tabulated Data:

Complete round:
- Type ---------- Training
- Weight assembled ---------- 4.43 lb
- Length assembled ---------- 7.72 in.

Projectile:
- Body material ---------- Cast iron

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Color:	
Old mfg	Black or blue w/white markings
New mfg	Bronze w/white markings
Filler and weight	Inert
Components:	
Ignition cartridge	M5A1 or M4 (complete)
Propellant charge	None
Percussion primer	M32
Fin assembly	M5 (or modified M2)
Fuze	None

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+51.7°C)
Storage:	
Lower limit	−80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4 hr/day) (+71.1°C)
*Packing	A training kit used in the field holds 10 training cartridges and accessories

*Packing Box:	
Weight	65 lb
Dimensions	21-7/16 x 18-5/16 x 7-27/32 in.
Cube	1.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	AMMUNITION FOR CANNON WITH INERT PROJECTILES
DODAC	1310-B629
Drawing number	9222994

Ballistics:

Charge	0
Muzzle velocity	46.4 mps (152.24 fps)
Maximum range	193 m (211.14 yd)

Limitations:

This round is to be fired at Charge 0 only.

Reference:

TM 9-3071-1
TM 9-1015-215-10

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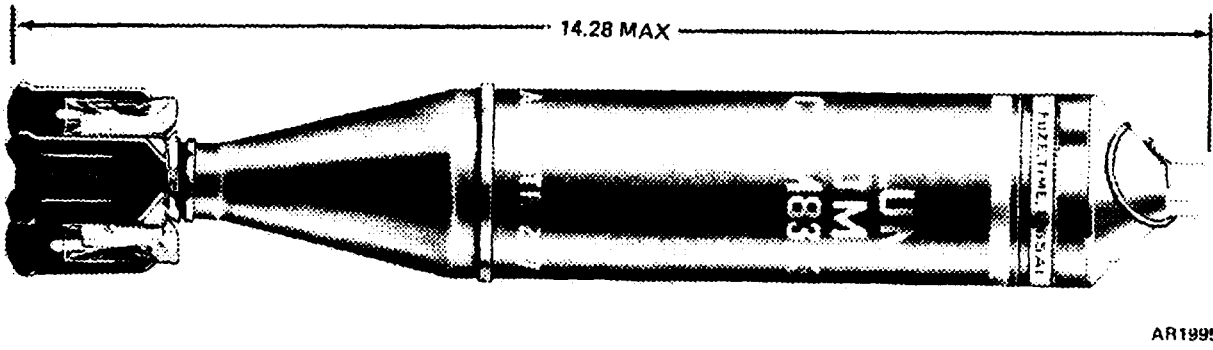
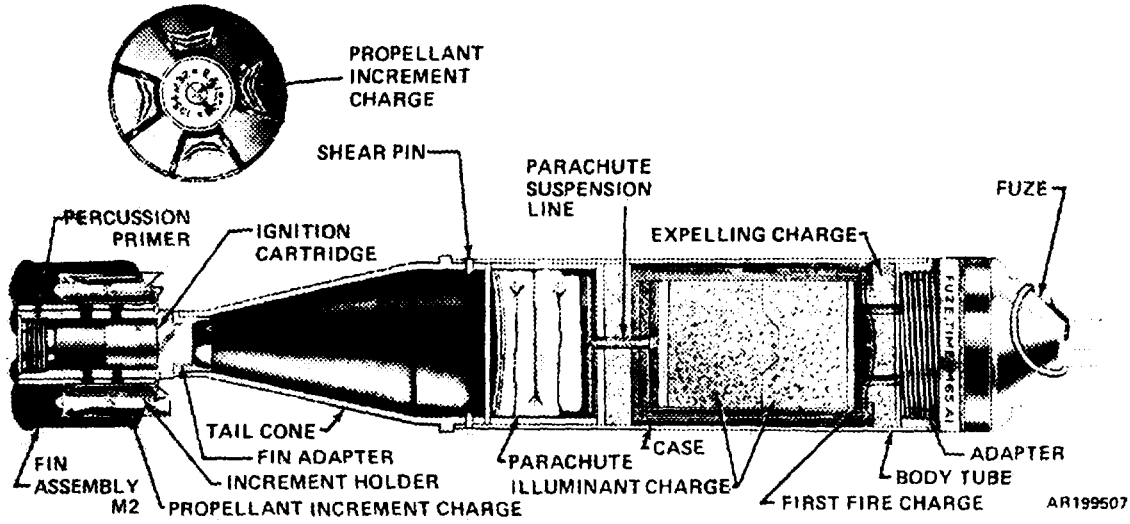
CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M83A3, M83A2, AND M83A1





Type Classification:

M83A3: Std AMCTC 8346, dtd 1971.
M83A2&A1: C&T OTCM 37119, dtd 1959.

Use:

This cartridge provides illumination for observation during night missions.

Description:

The complete round consists of a body tube, a tail cone assembly, an illuminant charge, a parachute assembly, a time fuze, a fin assembly with four increments of propellant charge, an ignition cartridge, and a percussion primer. The nose of the thin-walled steel body tube is fitted with a steel adapter, which is internally threaded to accept the fuze. The cone is fitted with an internally threaded adapter to accept the fin assembly and is attached to the body tube with four equally spaced shear pins. The illuminant assembly, which consists of a first-fire charge and an illuminant charge, is contained in a boxboard casing which is attached to the parachute with a suspension line. An expelling charge directly below the fuze, ejects the illuminant and parachute assembly.

Functioning

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge. The cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the desired height. The projectile is fin-stabilized in flight. The time fuze functions approximately 15 seconds after firing, detonating the expelling charge and igniting the first-fire charge through a length of quickmatch.

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The expelling charge separates the cone from the tube allowing the parachute and illuminant assembly to fall free, The first-fire charge ignites the illuminant charge, and the parachute deploys to support the burning charge.

Tabulated Data:

Complete round:
- Type ---------- Illuminating
- Weight w/fuze ---------- 4.15 lb
- Length w/fuze ---------- 14.28 in.

Projectile:
- Body material ---------- Steel tubing
- Color ---------- White w/black marking
- Filler and weight ---------- Illuminant, 0.49 lb

Illuminant charge:

	M83A3	M83A2	M83A1
Burn time	32 sec	32 sec	25 sec
Candlepower	250,000	250,000	145,000

Components:
- Ignition cartridge ---------- M5A2
- Propelling charge:
  - M83A3 ---------- M182
  - M83A2 & M83A1 ---------- M3A1
- Percussion primer ---------- M32
- Fin assembly ---------- M2
- Fuze ---------- Time, M65A1

Temperature Limits:

Firing:
- Lower limit ---------- - 40°F (-40°C)
- Upper limit ---------- +125°F (+51.7°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- + 160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- One round in jungle-wrapped fiber or metal container; multiple packing of fiber/metal containers in wooden box

*Packing Box:
- Weight ---------- 57 lb
- Dimensions ---------- 18-15/16 x 10-3/4 x 11-27/32 in.
- Cube ---------- 1.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0171
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1310-B627
- Drawing number ---------- M83A3, 9207516 M83A2, 75-1-143

Ballistics:

Charge	Muzzle Velocity (fps)	Horizontal Range (yd)	Horizontal Range (m)	Height of Burst (yd)	Height of Burst (m)	Elevation (deg/min)
2*	312	475	434	170	155	68/00
2	312	500	457	157	144	66/45
2	312	525	480	145	133	65/30
3	374	875	800	152	139	51/45
4	434	1100	1006	175	160	45/15

*Charge 2 is the ignition cartridge and 2 increment charges; Charge 4 is the ignition cartridge and 4 increment charges.

Limitations:

Firing this cartridge below Charge 2 will result in duds.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1

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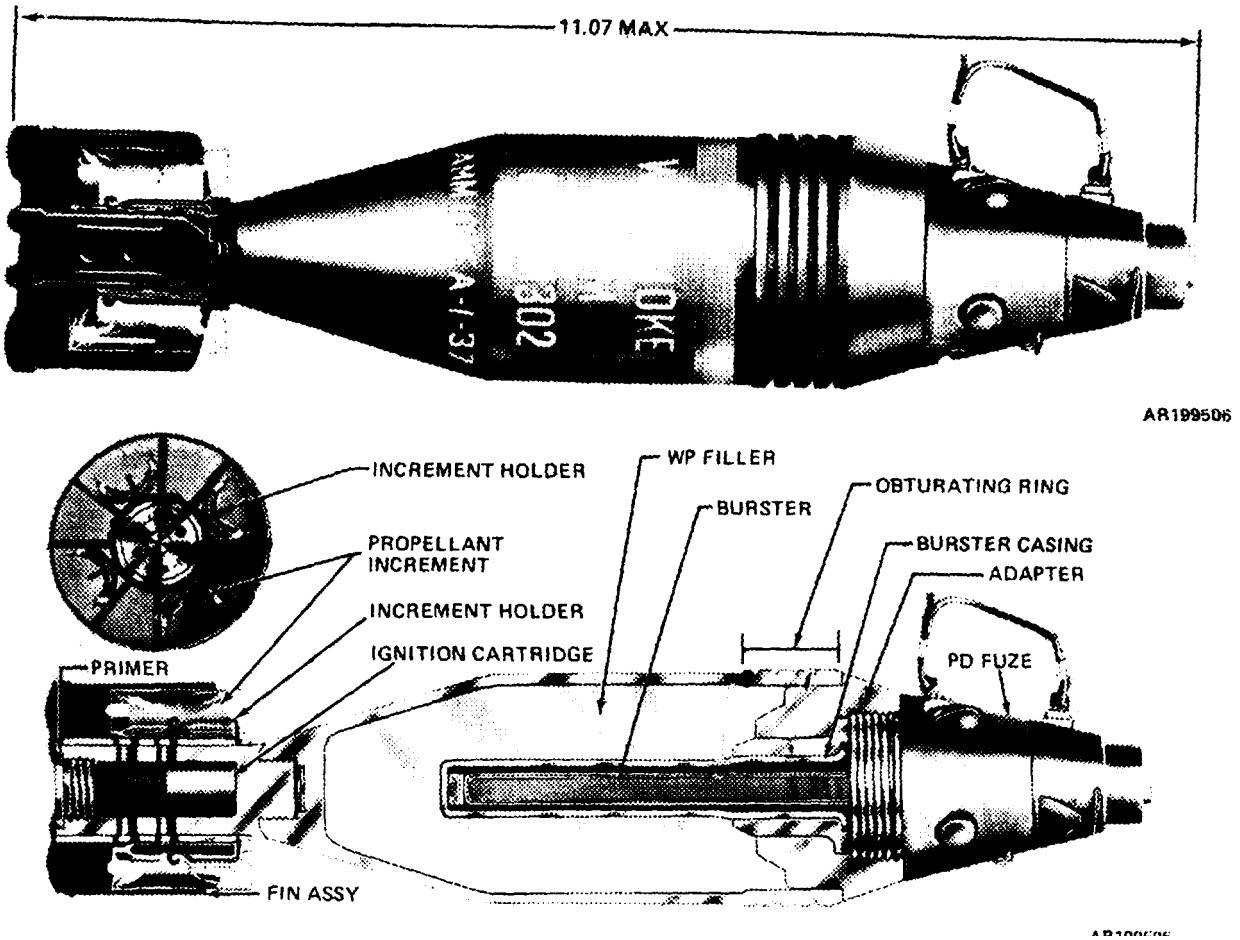
CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302



Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile with a PD fuze, a fin assembly four propellant increments, an ignition cartridge, and a percussion primer. The projectile body is of relatively thin-walled steel construction with cylindrical side walls, a conical base, and is filled with a charge of white phosphorous. The projectile base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, threaded to accept the fuze and designed to hold the casing of the burster assembly. One of two types of burster assemblies is used, differing only in the construction of the steel burster casing. Both carry the same designation. The burster charge consists of tetryl pellets under pressure, and the burster casing is press-fitted into the adapter in the projectile nose.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge. The ignition cartridge ignites the propellant charge, and gases from the propellant charge expel the projectile from the mortar and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white phosphorous filler. The white phosphorous ignites on contact with the air producing a cloud of dense white smoke.

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Tabulated Data:

Complete round:	
Type	Smoke, (WP)
Weight w/fuze	3.98 lb
Length w/fuze	11.07 in.
Projectile:	
Body material	Forged steel
Color, old mfg	Gray w/yellow band and yellow markings
Color, new mfg	Light green w/yellow band and light red markings
Filler and weight	WP, 0.75 lb
Burster charge	Tetryl, 0.38 oz
Components:	
Ignition cartridge	M5A1
Propellant charge	M3A1
Percussion primer	M32
Projectile burster	M19
Fin assembly	M2
Fuze	PD, M527 series

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+51.7°C)
Storage:	
Lower limit	-40°F (-40°C)
Upper limit	+145°F (+62.8°C]
*Packing	One round in fiber container; six containers in wooden box
*Packing Box:	
Weight	49.0 lb
Dimensions	15-3/8 x 13-11/16 x 8-15/32 in.
Cube	1.04 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1310-B630
Drawing number	9205340

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)
0*	156	244	219
1	244	570	520
2	316	912	833
3	380	1260	1154
4	439	1610	1472

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

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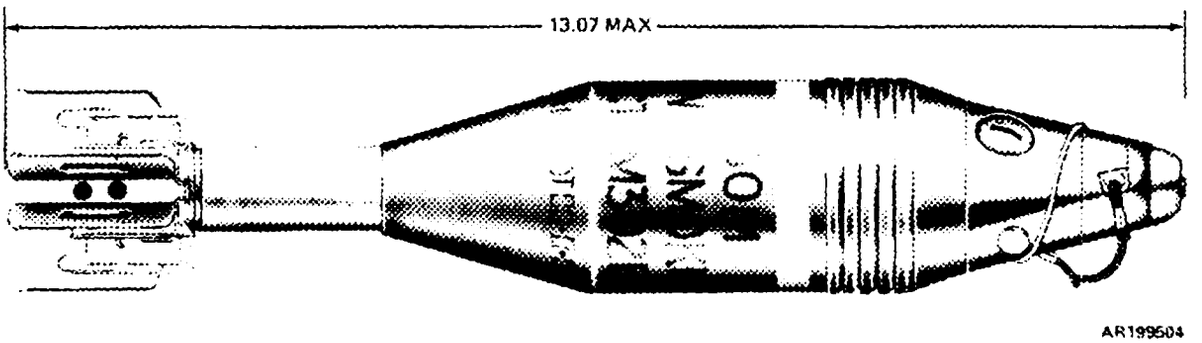
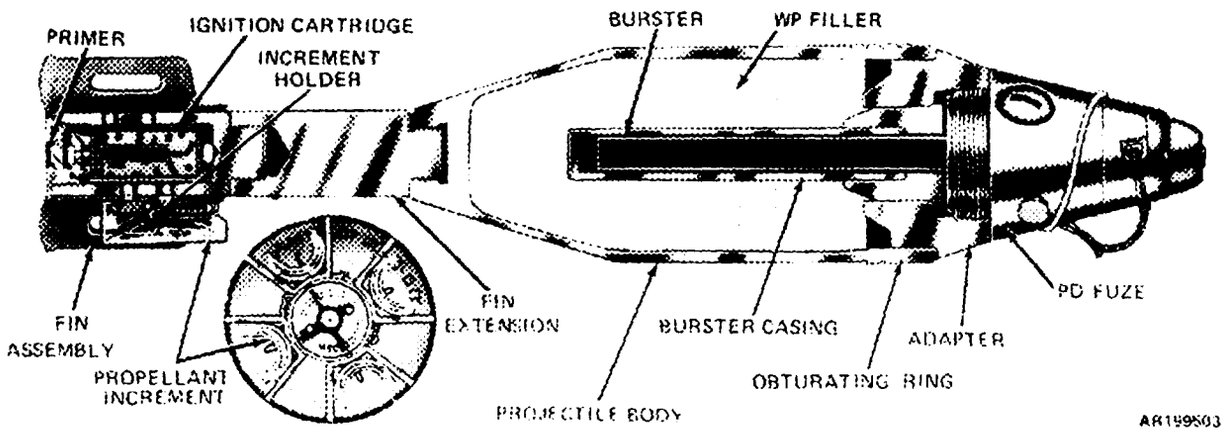
CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302A1 (M302E1) AND M302A2





Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm mortars M2 or M19 and is used for screening and spotting.

Description

The complete round consists of a projectile body with a PD fuze, a fin assembly and a 2-inch extension, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is a relatively thin-walled steel cylinder with a conical base, and is filled with a charge of white phosphorous. The base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, internally threaded to accept the fuze, and designed to hold the sleeve of the burster assembly. One of two types of burster assemblies is used, differing only in the construction of the steel burster casing. Both carry the same designation. The burster charge consists of tetryl pellets under pressure, and the burster casing is press-fitted into the adapter in the projectile nose.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge. The ignition cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the target. The PD fuze functions on impact, detonating the burster charge, which ruptures the projectile and disperses the white phosphorous filler. The white phosphorous ignites on contact with air, producing a cloud of dense white smoke.

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Tabulated Data:

Complete Round:
- Type ---------- Smoke (WP)
- Weight w/fuze ---------- 4.10 lb
- Length w/fuze ---------- 13.07 in.

Projectile:
- Body material ---------- Forged steel
- Color ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 0.75 lb
- Burster charge ---------- Tetryl, 0.38 oz

Components:
- Ignition cartridge ---------- M5A2
- Propellant charge ---------- M181
- Percussion primer ---------- M32
- Projectile burster ---------- M19
- Fin assembly ---------- M2 plus extension
- Fuze ---------- PD, M527B1

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+51.7°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- One round in fiber container; nine containers in wooden box

*Packing Box:
- Weight ---------- 56.6 lb
- Dimensions ---------- 17-3/4 x 10-7/8 x 11-27/32 in.
- Cube ---------- 1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
Quantity-distance class ---------- (12) 1.2
Storage compatibility group ---- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1310-B630
Drawing number ---------- 9215575

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	(m)
0**	156	195	213
1	244	488	535
2	316	839	916
3	380	1164	1272
4	439	1448	1582

**Charge 0 is the ignition cartridge only;

Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

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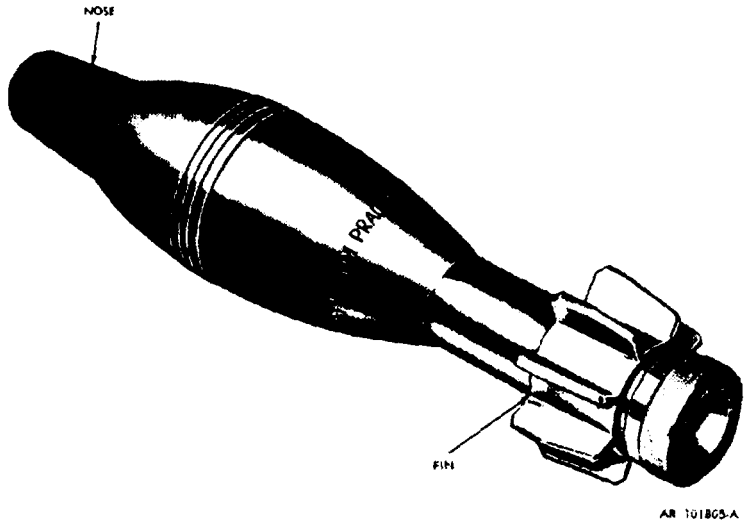
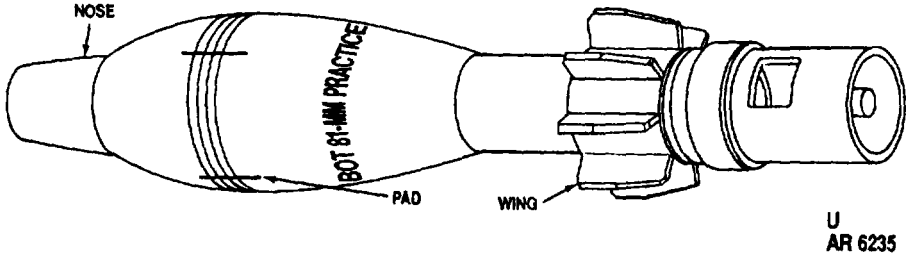
CARTRIDGE, 60MM MORTAR TRAINING DEVICE: 60MM SABOT (INERT) M3 AND 22MM SUBCALIBER PRACTICE CARTRIDGE M744, M745, M746 AND M747





Type Classification:

LCCA, STD, MSR 06806010,

Use:

The cartridge is a training device for all 60mm mortars. The cartridge provides realistic mortar firing training at distances which correspond to range fire distances in the ratio of 1 to 10. The subcaliber device of the cartridge can be fired using standard mortar sighting, fire control equipment and a special firing table (Operators Manual TM 9-1310-249-12&P) in the same manner as standard service mortar ammunition.

Description:

The cartridge consists of a 60mm M3 sabot which is assembled with a 22mm subcaliber practice cartridge M744, M745, M746 or M747. The 22mm subcaliber practice cartridges, M744 (Charge 1), M745 (Charge 2), M746 (Charge 3), and M747 (Charge 4) is comprised of a steel-bodied projectile which is assembled to a cartridge case containing a propelling and ejection charge. The projectile is flattened at the tip and contains a percussion piece assembly and smoke charge. A wingshaft assembly containing stabilizer fins (steel wrapped around the shaft) is press fitted into the body of the projectile. The propelling and ejection charges are contained in two separate chambers located in a jet-housing assembly, which is threaded into the base of the cartridge case. A flash tube hole between the chambers permits ignition of the propelling charge by the ejection charge. The cartridges are manufactured in a variety of four propellant charges. Each charge can be identified by notches on the jet screw assembly. One notch designates M744 (Charge 1), two notches designate M745 (Charge 2), etc.

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The 60mm M3 sabot (INERT) is designed to fire the 22mm subcaliber practice cartridge. When not loaded with a 22mm practice cartridge, the sabot (INERT) may be used as a dummy round. The sabot is rugged and can be reloaded and fired again (up to 2,000 times) for training purposes. The sabot (aluminum alloy body) has similar bore-riding dimensions and configuration of a 60mm mortar cartridge. It contains an insert 22mm barrel (not rifled) placed longitudinally to receive the 22mm subcaliber cartridge which is loaded in the barrel just prior to firing. The shaft of the sabot has stabilizer fins (similar to fins of the service mortar cartridge) to guide the sabot as it travels up the mortar tube when fired.

Functioning:

When the practice round (22mm subcaliber cartridge) is loaded into the sabot, the device is ready for firing. The protective plastic cap covering the percussion cap of the subcaliber cartridge must be removed prior to firing. The sabot with subcaliber cartridge is dropped into the mortar tube. The percussion cap strikes the firing pin of the mortar and is ignited. The percussion cap ignites an ejection charge in the jet-housing assembly. The gases emerge through the eight axial holes in the jet screw assembly initiating travel of the sabot and subcaliber cartridge up the mortar tube. Simultaneously the ejection charge ignites the subcaliber projectile propelling charge, also contained in the jet housing assembly. This propels the subcaliber projectile out of the cartridge case and through the barrel of the sabot. As the sabot leaves the muzzle of the mortar, the subcaliber projectile clears the barrel of the sabot. The sabot impacts the ground within 1 to 5 meters (depending upon charge fired) of the mortar tube, while the subcaliber projectile continues its flight down range to the target. On impact the projectile functions producing a yellow cloud of smoke and an audible sound.

Tabulated Data:

60mm Sabot M3:

Type	Practice
Weight	6.25 lb 2837.5 g (2.84 kg)
Length (overall)	16.181 in. 41.10 cm (411 mm)
Cannon used with	M2, M19, M224
Body material	Aluminum alloy/steel

22mm Subcaliber Practice Cartridge:

Type	Practice
Weight	1,097 lb, 497 g (0.497 kg
Weight of projectile	0.662 lb, 300 g (0.300 kg)
Length with protective cap (overall)	9.697 in. 24.6 cm (246,3 mm)
Length without protective cap (overall)	9.618 in. 24.4 cm (244.3 mm)

Ejection Charge:

Weight:	
Charge 1	0.05 oz nominal (1.5 g) nominal
Charge 2	0.05 oz nominal (1.5 g) nominal
Charge 3	0.06 oz nominal (1.7 g) nominal
Charge 4	0.06 oz nominal (1.7 g) nominal

Propelling Charge:

Weight:	
Charge 1	0.0302 nominal (0.8 g) nominal
Charge 2	0.04 oz nominal (1.1 g) nominal
Charge 3	0.06 oz nominal (1.6 g) nominal
Charge 4	0.08 oz nominal (2.1 g) nominal

Ballistics:

Muzzle velocity:	
Charge 1	148 ft/sec (45 m/sec)
Charge 2	164 ft/sec (50 m/sec)
Charge 3	197 ft/sec (60 m/sec)
Charge 4	230 ft/sec (70 m/sec)

Maximum effective range:		
Charge 1	639 ft	(195 m)
Charge 2	770 ft	(235 m)
Charge 3	1082 ft	(330 m)
Charge 4	1427 ft	(435 m)

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Temperature Limits:

Firing:	
Lower Limit	−40°F (−40°C)
Upper Limit	+120°F (+48.9 °C)
Storage:	
Lower Limit	−40°F (−0°C)
Upper Limit	+120°F (+48.9°C)

Packing:

60MM Sabot M3	3 Sabots / wooden box
Box dimensions	21-1/16 x 14-1/16 x 6 in. (53.47 x 35.72 x 15.24 cm)
Box weight	39 lb (17.706 kg)
Box cube	1.02 cu ft (28,886 cc)
22mm practice cartridge	1 cartridge /polystyrene compartment; 100 cartridges per wirebound box
Box dimensions	23 x 21-3/4 x 13-3/8 in. (58.42 x 55.25 x 33.97 cm)
Box weight	120 lb (54.33 kg)
Box cube	3.9 cu ft (110,448 cc)

Shipping & Storage Data:

UNO serial number	0015
Quantity-distance class	(04) 1.2
Storage compatibility group	G
Dot shipping class	C
Dot designation	PRACTICE AMMUNITION EXPLOSIVE C

Drawing Numbers:

	DODAC
Sabot 60mm Practice M3	9328601-1310-B611
Cartridge Subcaliber 22mm Practice:	
Charge 1, M744	9287907-1305-A680
Charge 2, M745	9287908-1305-A681
Charge 3, M746	9287909-1305-A682
Charge 4, M747	9287910-1305-A683

References:

TM 9-1300-251-20
TM 9-1310-249-12&P

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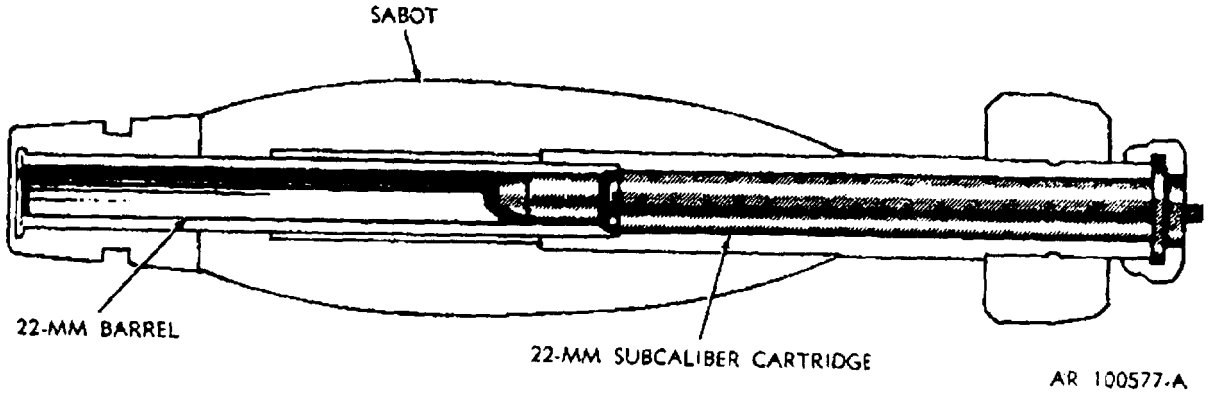
CARTRIDGE, 81MM: MORTAR TRAINING DEVICE, 81MM SABOT (INERT) M1 AND 22MM SUBCALIBER PRACTICE CARTRIDGE M744, M745, M746 AND M747



Type Classification:

Std MSR 06756032.

The 81mm sabot (Inert) is a training device for all 81mm mortars.

Description:

The sabot is designed to fire a 22mm subcaliber practice cartridge M744, M745, M746 or M747 (Charges 1, 2, 3, or 4 respectvely) as a training device in all model 81mm mortars. The sabot with 22mm subcaliber practice cartridges provides realistic mortar firing training at distances which correspond to range firing distances in the ratio of 1 to 10. The subcaliber device can be fired using standard mortar and sighting and fire control equipment and special firing table in the same manner as standard service mortar ammunition.

The aluminum body sabot has the bore-reading dimensions and configuration of an 81mm mortar cartridge. It contains an insert 22mm barrel (not rifled) placed longitudinally to receive the 22mm subcaliber cartridge which is loaded in the magazine just prior to firing. The shaft of the sabot has stabilizer wings and guide pads to guide the sabot as it travels up the mortar tube when fired. On firing, the loaded sabot is ejected from the mortar barrel and hits the ground within 1 to 5 yards (depending upon charge fired) in front of the mortar while the 22mm practice cartridge flies on to its target. The sabot may be used as a dummy round when not 1oaded with a 22mm practice cartridge. The sabot is rugged and can be reloaded and fired again up to 1000 times for training purposes. It is stored (INERT) in a packing box containing 3 rounds.

22mm Subcaliber Practice Cartridge:

The cartridge consists of the projectile with stabilizer fins and cartridge case (divided chambers). The projectile has a steel body flattened at the tip. The wing-shaft assembly press-fit into the projectile body contains the stabilizer tins (spring steel wrapped around the shaft) to stabilize flight. The wing-shaft assembly also serves to seal the base of the projectile body. The projectile body contains the Impact fuze and smoke signal charge. The propelling and ejection charges are contained in two separate chambers located in the jet-housing assembly, which is threaded into the base of the cartridge case. A flash tube hole between the chambers permits ignition of the propelling charge by the ejection charge. The cartridges are manufactured in a variety of four propellant charges. Each charge can be identified by notches on the jet screw saaembly. One notch designates M744 (Charge 1), two notches designate M745 (Charge 2), etc.

Functioning:

The protective plastic cap covering the percussion cap of the subcaliber cartridge must be removed prior to firing. When the practice round is loaded into the sabot, the device is ready for firing. When the sabot with the subcaliber cartridge is dropped into the mortar tube, the percussion cap strikes the firing pin of the

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mortar and is ignited. The percussion cap ignites the ejection charge in the jet housing assembly. The gasses emerge through the axial holes in the jet screw assembly initiating travel of the sabot and subcaliber cartridge up the mortar tube. Simultaneously the ejection charge ignites the subcaliber projectile propelling charge, also contained in the jet housing assembly. This propels the subcaliber projectile out of the cartridge case and through the barrel of the Sabot. As the sabot leaves the muzzle of the mortar, the subcaliber projectile clears the barrel of the sabot. The sabot impacts the ground within 1 to 5 yards (depending on charge fired) of the mortar tube, while the subcaliber projectile continues its flight down range.

Tabulated Data:

81mm Sabot:
- Type ---------- Practice
- Weight ---------- 8.5 lb
- Length ---------- 15.618 in.
- Cannon used with ---------- M1, M29, M29A1
- Body material ---------- Aluminum/ steel

22mm Subcaliber Practice Cartridge:
- Type ---------- Practice
- Weight ---------- 1.097 lb
- Length w/percussion cap ------ 9.697 in.
- Length w/o percussion cap--- 9.618 in.

Propelling Charge:
- Black powder weight:
  - Charge 1 ---------- 0.03 oz
  - Charge 2 ---------- 0.04 oz
  - Charge 3 ---------- 0.06 oz
  - Charge 4 ---------- 0.08 oz

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +120°F (+48.9°C)

Storage:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +120°F (+48.9°C)

Packing:
- 81mm sabot ---------- 3 round per packing box
- 22mm practice cartridges ----- 1 per polystyrene compartment; 100 cartridges per box

Packing Box:
- Weight ---------- 50 lb
- Dimensions ---------- 19 x 20 x 6-1/2 in.

Cartridges:
- Weight ---------- 1201b
- Dimensions ---------- 23 x 21-3/4 x 13-3/8 in.
- Cube ---------- 3.9 cu ft

Shipping and Storage Data:

- UNO serial number ---------- 0015
- Quantity-distance class ---------- (04) 1.2
- Storage compatibility group ---- S
- DOT shipping class ---------- G
- DOT designation ---------- PRACTICE AMMUNITION EXPLOSIVE C

Drawing Numbers:

	DODAC
Sabot 81mm Practice M1 -----	9287906-N/A*
Cartridge Subcaliber 22mm Practice:	
Charge 1 M744----------	9287907-1305-A680
Charge 2 M745----------	9287908-1305-A681
Charge 3 M746----------	9287909-1305-A682
Charge 4 M747----------	9287910-1305-A683

*Sabot 81mm practice M1 is a reusable item - DODAC not required

Ballistics:

Muzzle velocity:
- Charge 1 ---------- 148 ft/sec (45 m/sec)
- Charge 2 ---------- 164 ft/sec (50 m/sec)
- Charge 3 ---------- 197 ft/sec (60 m/sec)
- Charge 4 ---------- 230 ft/sec (70 m/sec)

Maximum effective range:
- Charge 1 ---------- 639 ft (195 m)
- Charge 2 ---------- 770 ft (235 m)
- Charge 3 ---------- 1082 ft (330 m)
- Charge 4 ---------- 1427 ft (435 m)

References:

TM 9-1300-251-20
TM 9-1315-249-12&P

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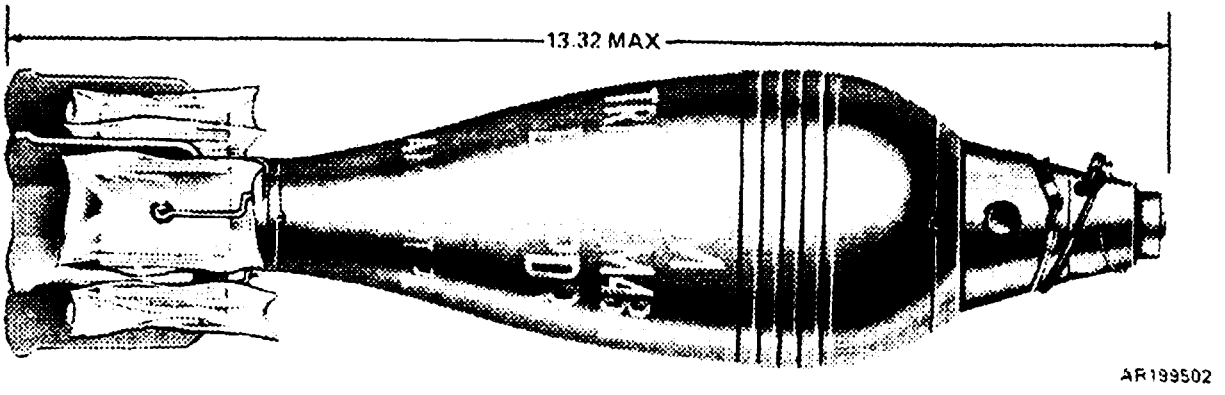
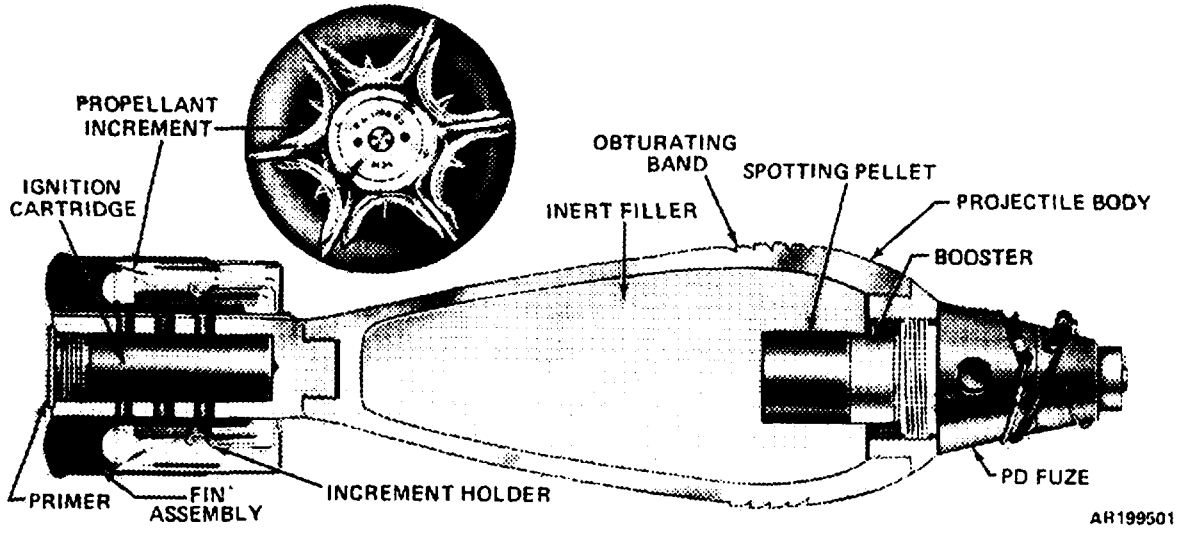
CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE, M43A1





Type Classification:

C&T AMCTC 6267 dtd 1968.

Use:

This cartridge is used for target practice and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a PD fuze, a fin assembly, a propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of forged steel, and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is loaded with an inert plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet containing a spotting charge of black powder is loaded in a cavity just below the booster charge of the fuze.

Functioning:

When the cartridge is loaded, it slides down the mortar tub; until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer detonates the ignition cartridge, the cartridge ignites the propellant charge, and gases from the propellant charge expel the projectile and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the fuze booster charge and the spotting charge.

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Difference Between Models:

One series has a modified fuze in which the tetryl booster charge has been replaced with a black powder booster charge.

Tabulated Data:

Complete Round:
- Type ---------- TP
- Weight ---------- 07.29 lb
- Length ---------- 13.32 in.
- Cannon used with ---------- M1, M29, M29A1

Projectile:
- Body material ---------- Forged steel
- Color:
  - Old ---------- Blue or black w/white markings
  - New ---------- Blue w/white markings
- Filler and weight ---------- Inert, 1.29 lb
- Spotting charge ---------- BP, 24.8± 1.5g

Components:
- Ignition cartridge ---------- M8
- Propellant charge ---------- M1A1
- Percussion primer ---------- M34
- Fin assembly ---------- M3
- Fuze ---------- PD,M52A1B1

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round in fiber container; 4 fiber containers in wooden box

*Packing box:
- Weight ---------- 49.8 lb
- Dimensions ---------- 17-3/4 x 9-11/16 x 10-15/32 in.
- cube ---------- 1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:
- UNO serial number ---------- 0321
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1315-C227
- Drawing number ---------- 75-1-89

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
**0	238	517	565
1	351	1024	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

**Charge 0 is the $_{\text{ignition}}$ cartridge only; Charge 1 is the ignition cartridge andone increment charge; Charge 8 is the ignition cartridge and eight increment charges.

References:

AMC-P 700-3-3
SB 700-20
TM 9-3071-1
TM 9-1300-251-20

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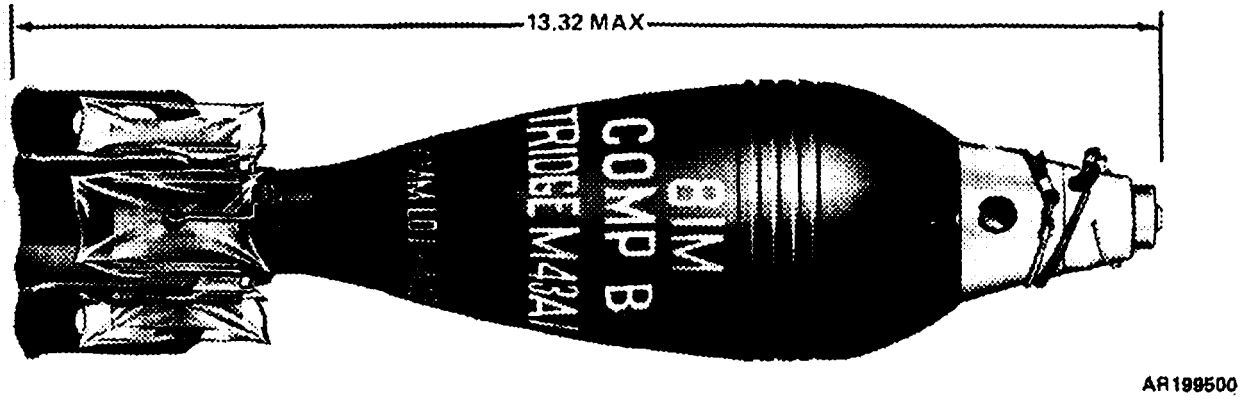
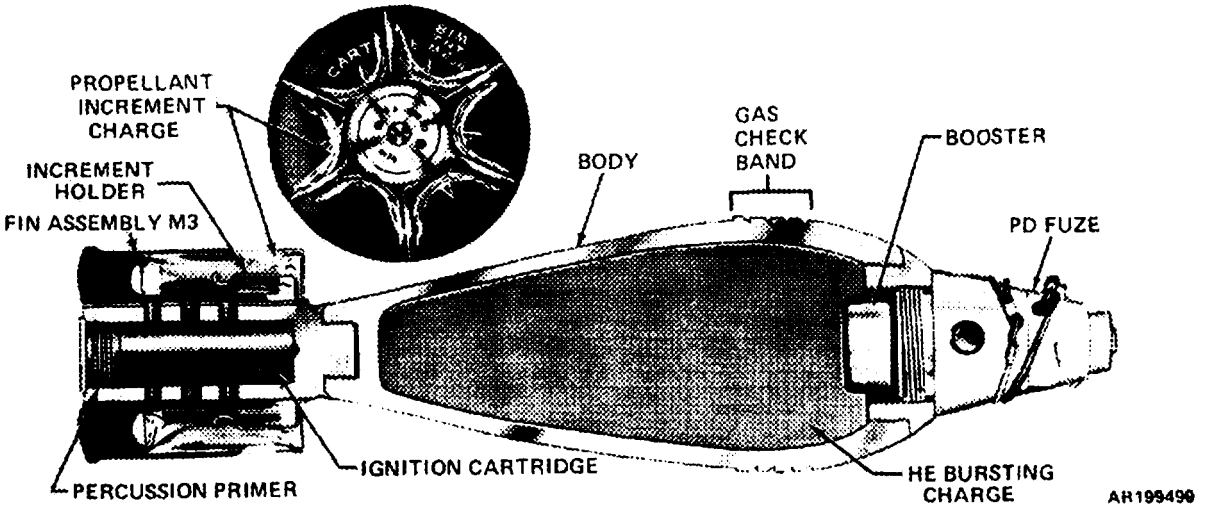
CARTRIDGE, 81 MILLIMETER: HE, M43A1 AND M43A1B1





Type Classification:

OBS 11756003.

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a tin assembly a propellant charge, and an ignition charge with a percussion primer. The projectile body is of forged steel, and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact detonating the fuze booster charge and, in turn, the high explosive charge. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

Difference Between Models:

The two cartridges differ only in some minor metal parts.

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Tabulated Data:

Complete Round:
- HE
- Weight ---------- 07.5 lb
- Length ---------- 13.32 in.
- Cannon used with ---------- M1, M9, M29A1

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp. B, 01.29 lb

Components:
- Ignition cartridge ---------- M8 or M6
- Propellant charge ---------- M1A1
- Percussion primer ---------- M34
- Fin assembly ---------- M3
- Fuze ---------- PD, M525 series PD, M717

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round in fiber containers; 4 containers in wooden box

*Packing box:
- Weight ---------- 49.8 lb
- Dimensions ---------- 17-3/4 x 9-11/16 x 10-15/32 in-
- Cube ---------- 1.0 cu ft

*NOTE: See DOD Consolidated Ammunition catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class ---------- (08) 1,2
Storage compatibility group ---- E
Dot shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C225
Drawing number ---------- 9218433

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum (m)	Range (yd)
** 0	238	517	565
1	351	1029	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

**Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

References:

AMC-P 700-3-3
SB 700-20
TM 9-3071-1
TM 9-1300-251-20

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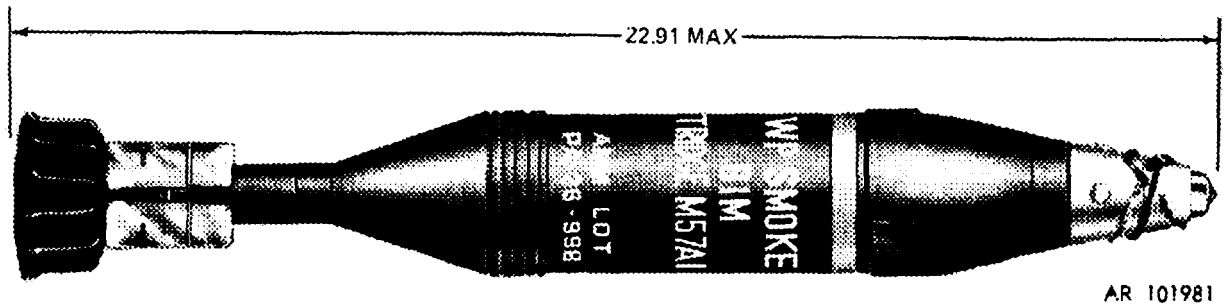
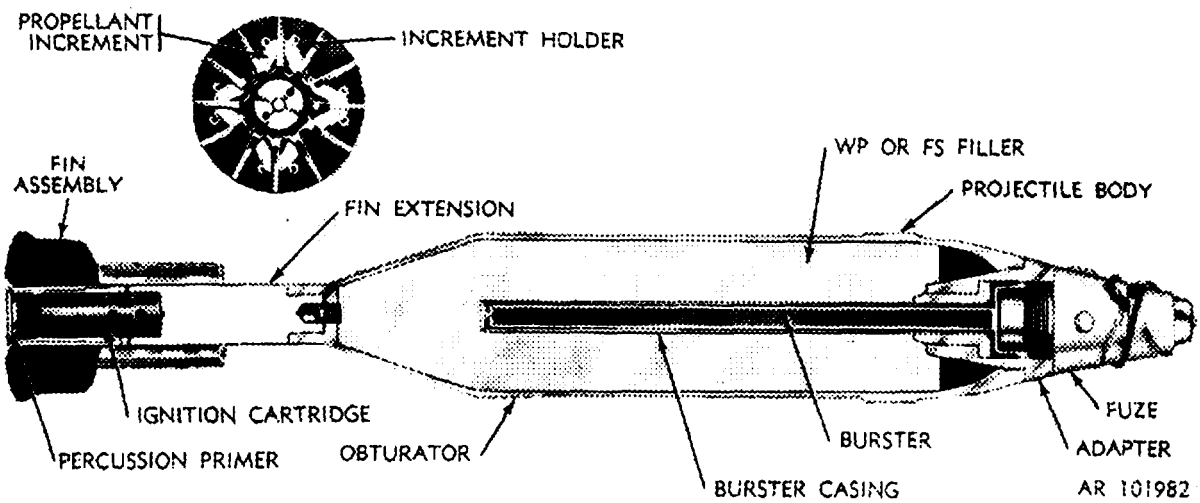
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M57A1 AND M57





Type Classification:

With WP Filler: CON 11756003.
With FS Filler: OBS OTCM 37196 dtd 1961.

Use:

This cartridge is used against personnel and materiel as an incendiary device and also to produce screening smoke.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly a propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of relatively thin-walled steel, and is filled with white phosphorous (WP) or a liquid smoke filler (FS). The base of the projectile is internally threaded to accept the fin assembly, and the nose is fitted with a steel adapter. The adapter is internally threaded to accept the fuze, and is designed to hold the burster assembly. The burster assembly is a thin-walled steel tube filled with tetryl and extends into the smoke charge.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube with the velocity required to reach the target. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the chemical filler. Both WP and FS react spontaneously on contact with the air; WP ignites producing a dense white smoke and some incendiary effect, while FS, combining with the moisture in the air, creates a cloud-like smoke screen without burning.

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Difference Between Models:

The M57 is fitted with the M4 fin assembly and the M57A1 uses the M4A1 assembly. These differ in minor manufacturing details only. Cartridges with liquid smoke filler (FS) are classified as obsolete.

Tabulated Data:

Complete Round:
- Type ---------- Smoke
- Weight ---------- 11.38 lb
- Length ---------- 22.91 in.
- Cannon used with ---------- M1, M29, M29A1

Projectile:
- Body material ---------- Steel
- Color ---------- Grey w/yellow markings
- Filler and weight ---------- WP, 4.06 lb
- Burster charge ---------- Tetryl, 0.08 lb

Components:
- Burster assembly ---------- M1
- Ignition cartridge ---------- M6
- Propellant charge ---------- M2A1
- Percussion primer ---------- M34
- Fin assembly ---------- M4, M4A1
- Fuze ---------- M525 series

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round in fiber container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 43.0 lb
- Dimensions ---------- 28 x 9-11/16 x 6-15/32 in.
- Cube ---------- 1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
Quantity-distance class ---------- (12) 1.2
Storage compatibility group ---- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C230
Drawing number ---------- 75-l-93

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	(yd)
1**		630	700
2		1199	1300
3		1646	1800
4		2169	2872

**Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-3071-1

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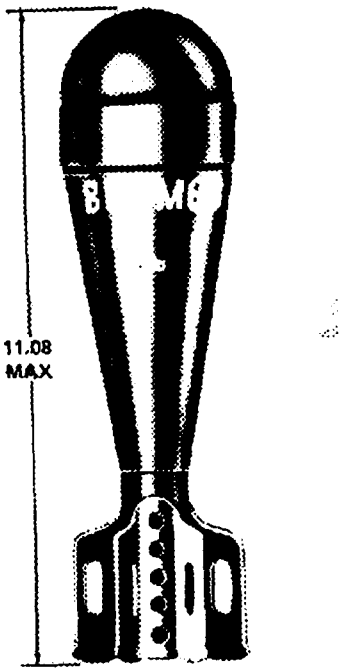
CARTRIDGE, 81 MILLIMETER: TRAINING, M68



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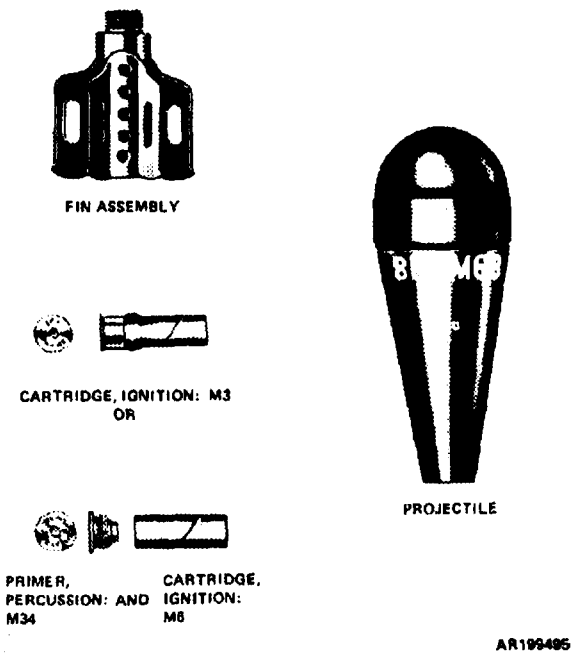

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

This cartridge is used for training in the loading and firing of the 81mm mortar.

Description:

Unlike other mortar ammunition, the components of this round are issued separately to facilitate replacement of damaged, worn, or expended parts. The complete round consists of an inert projectile, a fin assembly, and an ignition cartridge. The pear-shaped, cast iron projectile has no provision for a fuze and is internally threaded at the base to accept the fin assembly.

Functioning:

When the cartridge is loaded it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Since the projectile is inert, there is no detonation upon impact, and the cartridge may be recovered for reuse.

Tabulated Data:

Complete Round:	
Type	Training
Weight, assembled	10.79 lb
Length, assembled	11.08 in.
Cannon used with	M1, M29, M29A1
Projectile:	
Body material	Cast iron
Color	Black w/white markings Later manufacture - no paint or bronze body)
Filler and weight	Inert
Components:	
Ignition cartridge	M6 or M3
Propellant charge	None
Percussion primer	M34
Fin assembly	M6
Fuze	None

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Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days)
- Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- A training kit used in the field holds ten training cartridges and accessories

*Packing Box:
- Weight ---------- 51.0 lb
- Dimensions ---------- 25-11/16 x 13-9/16 x 6-11/32 in.
- Cube ---------- 1.4 cu ft

*NOTE: See DOD Consolidated Ammuntion Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ---------- 4
Storage compatibility group ---- E
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH INERT PROJECTILES
DODAC ---------- 1315-C228
Drawing number ---------- 75-2-302

Ballistics:

Charge ---------- 0
Muzzle velocity ---------- 173 fps
Maximum range ---------- 284 m

Limitations:

This round is to be fired at Charge 0 only.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-3071-1

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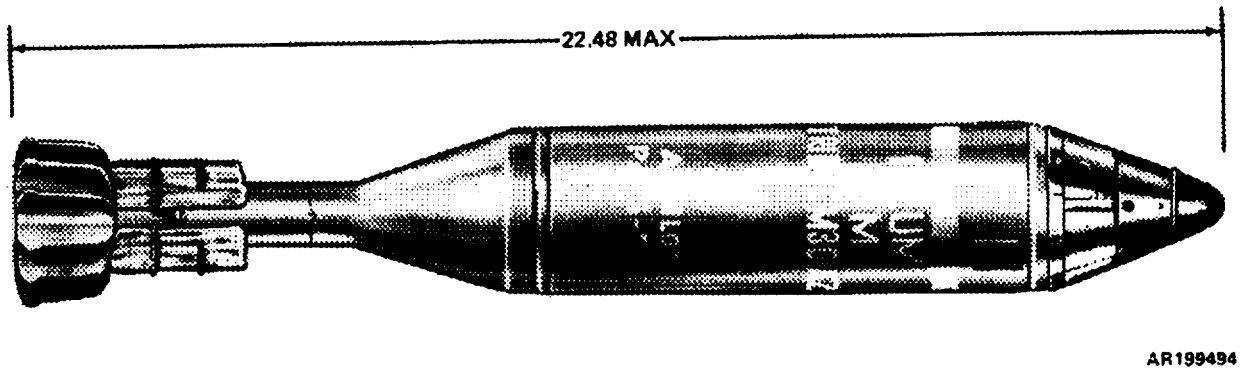
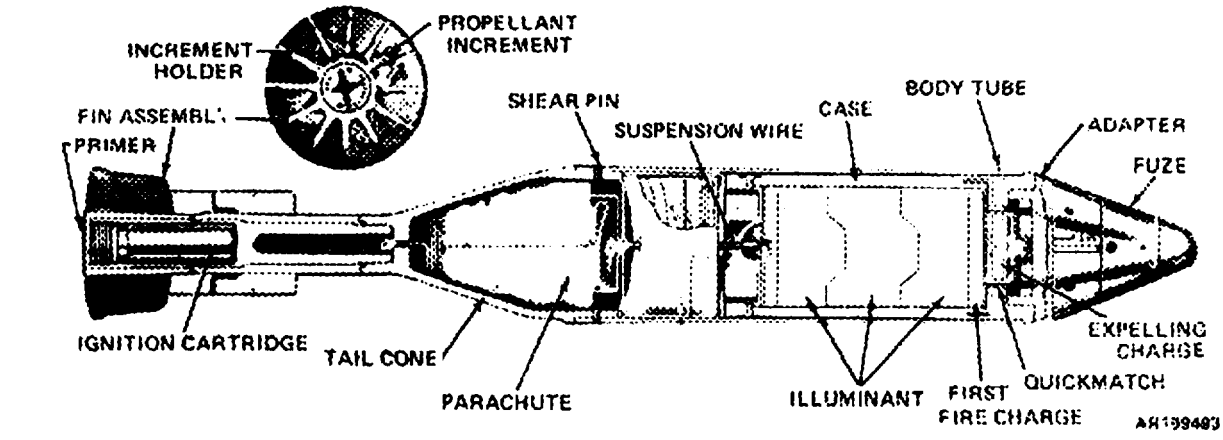
CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A2 AND M301A1





Type Classification:

CONT MSR 11756003.

Use:

This projectile is used for illuminating a desired point or area.

Description:

The complete round consists of a body tube and tail cone assembly, an illuminant candle, and parachute assembly a time fuze with a built in expelling charge, a fin assembly with propellant charge, and an ignition cartridge with percussion primer. The nose of the thin-walled steel tubing body is fitted with a steel adapter and internally threaded to accept the fuze. The tail cone is internally threaded to accept the tin assembly, and is attached to the body tube with four equally spaced shear pins. The illuminant assembly consisting of a first-fire charge and an illuminant charge, is contained in a boxboard case and attached to the parachute with a 30-inch suspension line.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quickmatch. The expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the burning candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

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Difference Between Models:

Cartridge M301A1 has gas check bourrelet grooves and some minor dimensional differences in metal parts.

Tabulated Data:

Complete Round:
- Type ---------- Illuminating
- Weight ---------- 10.7 lb
- Length ---------- 22.48 in.
- Cannon used with ---------- M1, M29, M29A1, M252

Projectile:
- Body material ---------- Steel tube
- Color:
  - Old ---------- Gray w/white band white markings
  - New ---------- White w/black markings
- Filler and weight ---------- Illuminating, 1.37 lb

Components:
- Ignition cartridge ---------- M6
- Propellant charge ---------- M2A1
- Percussion primer ---------- M34
- Fin assembly ---------- M4A1
- Fuze ---------- Time, M84

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- One round in jungle wrapped fiber or metal container; three fiber/metal containers in wooden box

*Packing Box:
- Weight ---------- 53.6 lb
- Dimensions ---------- 30-9/16 x 13-15/16 x 6-25/32 in.
- Cube ---------- 1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0171
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1315-C226
- Drawing number ---------- 8865058

Ballistics:

Charge	Muzzle Velocity (fps)	Range to Burst (m)	Range to Burst (yd)
2*	440	1000	1094
3	517	1600	1750
4	595	2150	2350

*Charge 2 is the ignition cartridge and two increment charges; Charge 4 is the ignition charge and four increment charges.

Limitations:

Firing with less than two propellant increment charges (Charge 2) is not authorized.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-3071-1

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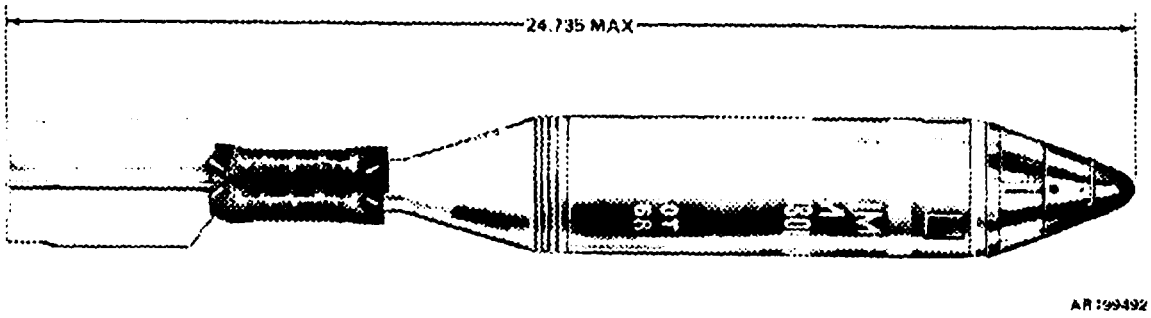
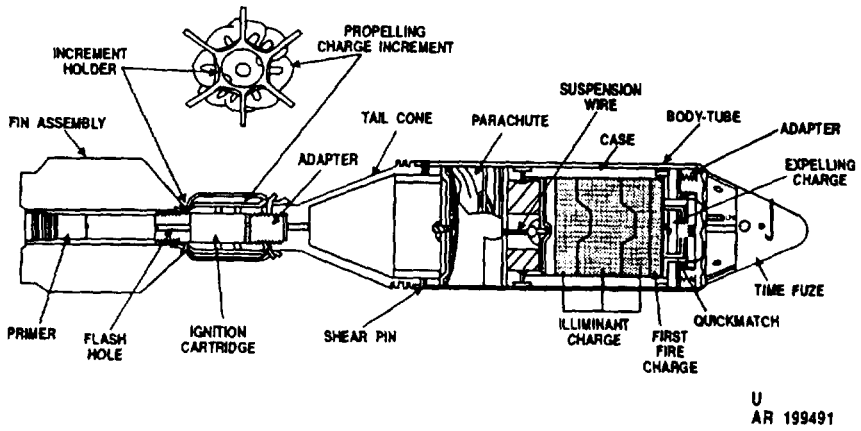
CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A3





Type Classification:

Std AMCTC 6390, dtd 1968.

Use:

This cartridge is used for illuminating a desired point or area.

Description:

The complete round consists of a body tube and tail cone assembly, an illuminant candle and parachute assembly a time fuze with a built-in expelling charge, a fin assembly with a cartridge housing and propellant increment charges, and an ignition cartridge with percussion primer. The nose of the thin-walled steel-tubing body is fitted with a steel adapter and internally threaded to accept the fuze. The tail cone may be internally or externally threaded, depending upon the model. Models that are internally threaded require an adapter for attaching the fin assembly. The tail cone is attached to the body with four equally spaced shear pins. The illuminant assembly, consisting of a first-fire charge and an illuminant charge, is contained in a boxboard case and attached to the parachute with a 30-inch suspension line.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quickmatch. The expelling charge also separates the cone from the tube, allowing the illuminant candle and parachute assembly to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

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Difference Between Models:

Fin assembly attaches with or without adapter, depending upon design of the tail cone.

Tabulated Data:

Complete Round:

Type	lluminating
Weight	10.1 lb
Length	24.735 in.
Cannon used with	M1, M29, M29A1, M252

Projectile:

Body material	Steel tube
Color	White w/black markings
Filler and weight	Illuminating, 1.37 lb

Components:

Ignition cartridge	M66A1
Propellant charge	M185
Percussion primer	M71A2
Fin assembly	M158
Fuze	Time, M84A1

Temperature Limits:

Firing:

Lower limit	-40°F (-40°C)
Upper limit	125°F (+52.0°C)

Storage:

Lower limit	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4 hr/day) (+71.1°C)
*Packing	One round in jungle wrapped fiber or metal container; three fiber/metal containers in wooden box

*Packing Box:

Weight	53.6 lb
Dimensions	30-9/16 x 13-15/16 x 6-25/32 in.
Cube	1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0171
Quantity-distance class	(08) 1.2
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC	1315-C226
Drawing number	9220705

Ballistics:

Charge	Fuze Setting (sec)	Horizontal Range (m)	Height of burst (m)	Elevation (mi.)
3*	20.6	250	600	1501.1
3	19.93	250	600	1501.1
3	15.9	1050	600	1042.1
4	19.8	1550	600	1004.3
5	22.1	2050	600	942.6
6	26.1	2450	600	967.4
7	27.6	2950	600	904.7
8	29.8	3150	600	883.9

*Charge 3 is the ignition cartridge and three increment charges; Charge 8 is the ignition cartridge and eight increment charges.

Limitations:

Firing with less than three propellant increment charges (Charge 3) is not authorized. Exposure of the propelling charge to moisture can produce short rounds.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-7031-1

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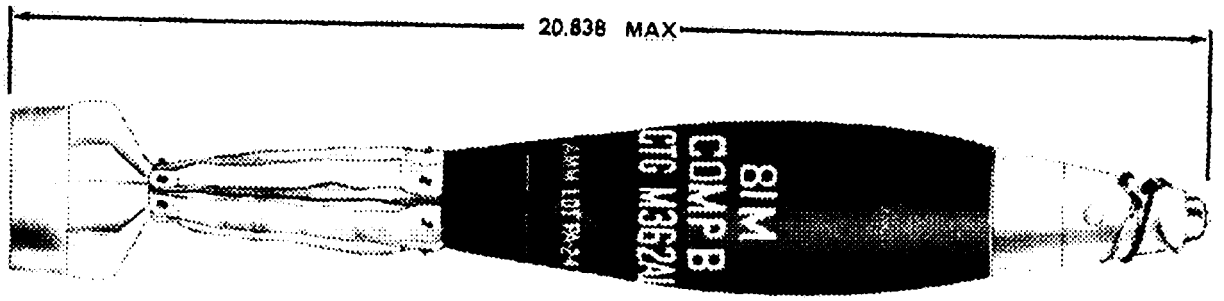
CARTRIDGE, 81 MILLIMETER: HE, M362A1 AND M362



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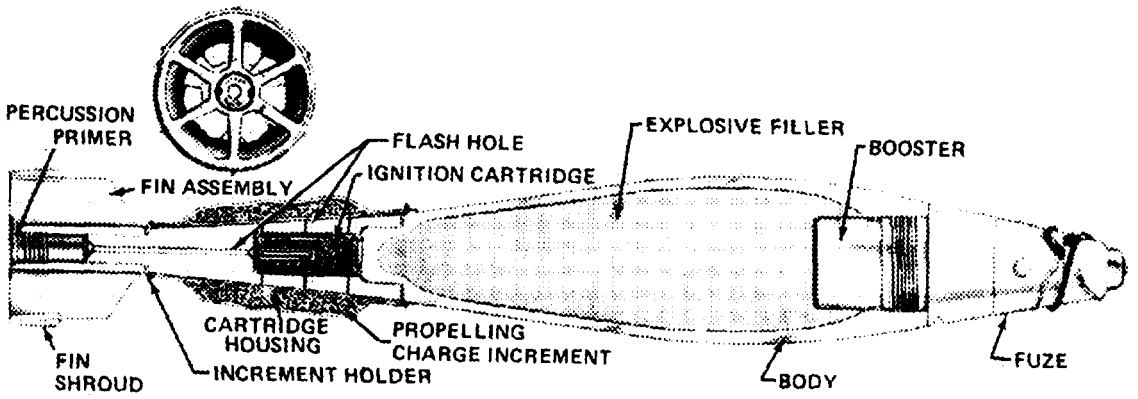

AR199489

Type Classification:

M362A1: Std AMCTC 1770, dtd 1964.
M362: CON 11756003.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or a proximity fuze, a fin assembly that includes a cartridge housing and propellant increment charges, an ignition charge, and a percussion primer. The projectile body is of pearlitic malleable iron (PMI), and is threaded internally at the nose to accept the fuze and externally at the base to accept the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts over or on the target, producing near optimum fragmentation and blast effect.

Difference Between Models:

The projectile body of the M362 is of forged steel.

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Tabulated Data:

Complete Round:
- Type ---------- HE
- Weight, w/fuze ---------- 9.42 lb
- Length, w/fuze ---------- 20.838 in. (max)
- Cannon used with ---------- M1,M29, M29A1, M252

Projectile:
- Body material ---------- M3621, cast PMI; M362 forged steel
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 2.10 lb

Components
- Ignition cartridge ---------- M66
- Propellant charge ---------- M5
- Percussion primer ---------- M71, M71A1
- Fin assembly ---------- M141
- Fuze ---------- PD, M524 series; PD, M526 series: PD, M716; Prox, M532

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- One round in fiber container three containers in wooden box

*Packing Box:
- Weight---------- 51.0 lb
- Dimensions ---------- 25-11/16 x 13-9/16 x 6-11/32 in.
- Cube ---------- l.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0321
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1315-C222, 1315-C223
- Drawing number ---------- M362A1, 8838144 M362, 7549034

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0*	181	297	324
1	298	777	849
2	397	1301	1430
3	480	1791	1951
4	554	2246	2450
5**	620	1657	2910
6	673	3027	3300
7	722	3327	2740
8	775	3618	3940

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges,

**Charge 5 is the maximum authorized for firing in Mortar M1.

Limitations:

See above chart.

References:

TM 9-1300-251-20
TM 9-7031-1

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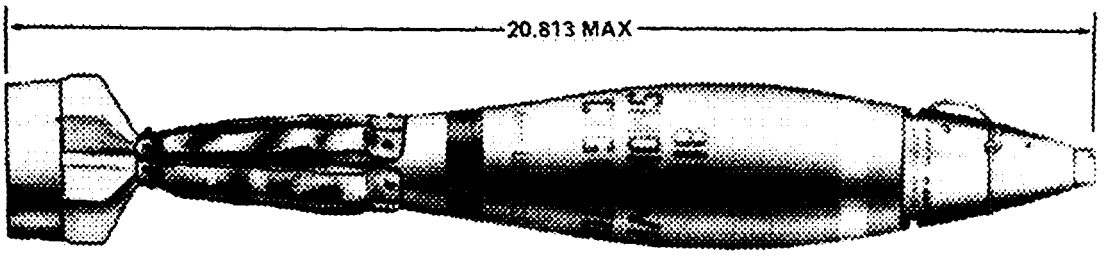
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M370



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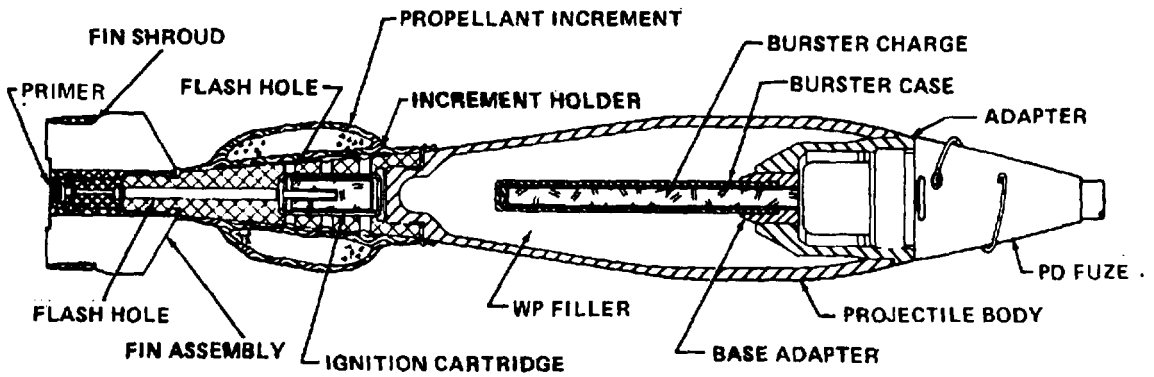

AR199487

Type Classification:

Std AMCTC 2048, dtd 1964.

Use:

This cartridge is used to produce a smoke screen.

Description:

The complete round consists of a projectile body with a burster assembly a point-detonating fuze, a fin assembly that includes a cartridge housing, a propellant charge, an ignition charge, an a percussion primer. The projectile body is of relatively thin-walled steel, and is filled with white phosphorous. The base of the projectile is externally threaded to accept the cartridge housing of the fin assembly. The nose of the projectile is fitted with a steel adapter designed to hold the burster casing, and internally threaded to accept the fuze. The burster casing is a thin-walled steel cylinder press-fitted into the adapter and containing a burster charge of RDX.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the tin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white phosphorous filler. WP ignites spontaneously on contact with the air producing dense white smoke.

Tabulated Data:

Complete Round:

Type	Smoke (WP)
Weight	9.34 lb
Length	20.813 in.
Cannon used with	M1, M29, M29A1, M252

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Projectile:	
Body material	Steel
Color:	
Old	Grey w/yellow band and yellow markings
New	Light green w/yellow band and light red markings
Filler and weight	WP, 1.60 1b
Burster charge	RDX,0.025 lb
Components:	
Booster assembly	M47
Ignition cartridge	M66
Propellant charge	M5
Percussion primer	M71E1
Fin assembly	M141
Fuze	PD,M524A4 PD,M526 series

Temperature Limits:

Firing:	
Lower limit	-40°F(-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4hr/day) (+71.1°C)
*Packing	One round in fiber container; three fiber containers in wooden box
*Packing Box:	
Weight	51.0 lb
Dimensions	25-11/16 x 13-9116x6-11132 in.
Cube	1.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITIONFOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C234
Drawing number	8848900

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0**		274	300
1		640	700
2		1188	1300
3		1691	1850
4		2148	2350
5***		2661	2920
6		2926	3200
7		3292	3600
8		3646	3987

**Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

***Charge 5 is the maximum authorized for firing in mortar M1.

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP tiller.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

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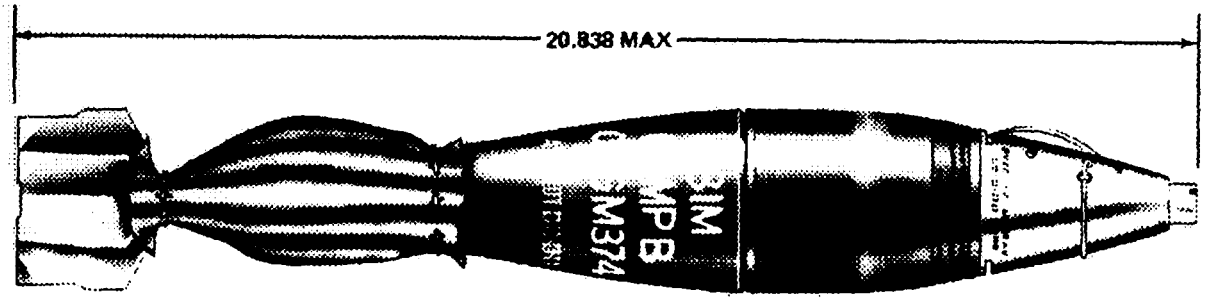
CARTRIDGE, 81 MILLIMETER: HE, M374A2 AND M374



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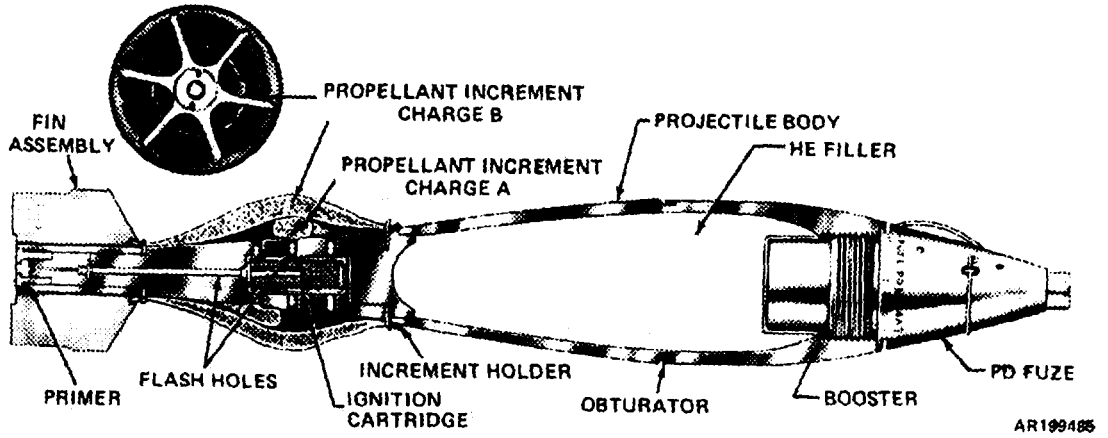

AR199485

Type Classification:

Std LCC-B, dtd 1975 (M374A2).
CON 11756003 (M374).

Use:

This cartridge is used against personnel and materiel, producing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body a point-detonating or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge with two types of increment charges, an ignition charge, and a percussion primer. The projectile body is threaded internally at the nose to accept the fuze and externally at the base to accept the fin assembly. The projectile is filled with Composition B high explosive. The fins are canted 5 degrees to produce spin.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the tin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central hole in the cartridge housing to ignite the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Difference Between Models:

The projectile body may be of forged steel or pearlitic malleable iron (PMI). Early production used the M66 ignition cartridge with the M149 fin assembly while later series used the M285 cartridge and M170 fin assembly. Model M374A2 is a modification of M374 to include

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moisture-proof ignition system, moisture resistant propelling charges, and improved protective packaging.

Tabulated Data:

Complete Round:
- Type ---------- HE
- Weight ---------- 9.34 lb
- Length ---------- 20.838 in.
- Cannon used with ---------- M1, M29, M29A1

Projectile:
- Body material ---------- Forged steel or cast PMI
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 2.10 lb

Components:
- Ignition cartridge ---------- M66A1 with fin assembly M149 M285 with fin assembly M170
- Propellant charge ---------- M90 (A and B) M374, M90A1 (A and B) M374A2
- Percussion primer ---------- M71A2
- Fin assembly ---------- M149 w/ignition cartridge M66A1; M170 w/ignition cartridge M285
- Fuze ---------- PD, M524 series, PD, M526 series. PD, M567, PD, M716, Prox, M532

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- One round per fiber container in jungle wrap, one round per plastic container in barrier bag; three containers per wooden box

Packing Box:
- Weight ---------- 51.0 lb
- Dimensions ---------- 26-3/16 x 13-15/16 x 6-25/32 in.
- Cube ---------- l.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0321
- Quantity-distance class ---------- (08) 1.2
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1315-C236, 1315-C256

Drawing number:
- With fuze ---------- 8881026
- Without fuze ---------- 9225283

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Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	(yd)
0**	210	403	442
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5***	656	2955	3237
6	709	3416	3740
7	764	3831	4190
8	814	4197	4598
9	856	4500	4932

Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges. **(NOTE: Increment A is used as Charge 1 and will be one of the increments assembled when fining above Charge 1.)

***Charge 5 is the maximum authorized for firing in mortar M1.

Limitations:

Firing with more than five propellant increment charges (Charge 5) is not authorized in mortar M1.

When firing as many as 10 cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds-per-minute.

Occasional short rounds will occur when firing at Charge 3 or below.

Rounds assembled with Fuze, PD, M524A1, M52A2, M524A3, M524A4 are for USMC/USN use only.

References:

TM 9-3071-1
TM 9-1300-251-20

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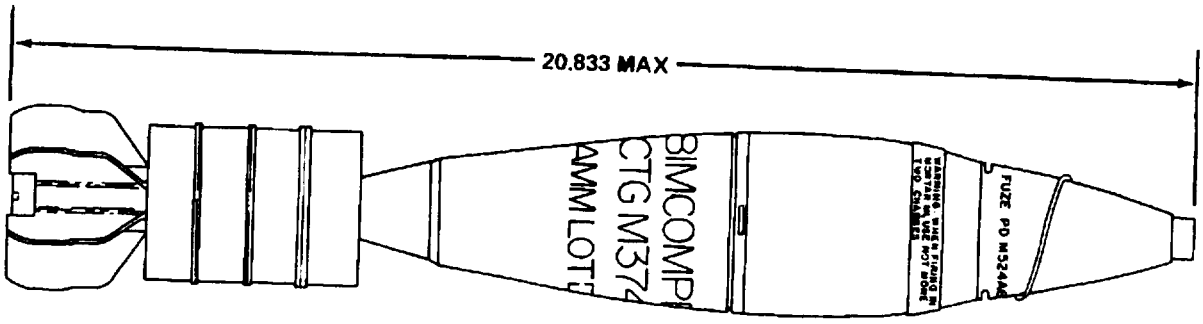
CARTRIDGE, 81 MILLIMETER: HE, M374A3 (M374A2E1)



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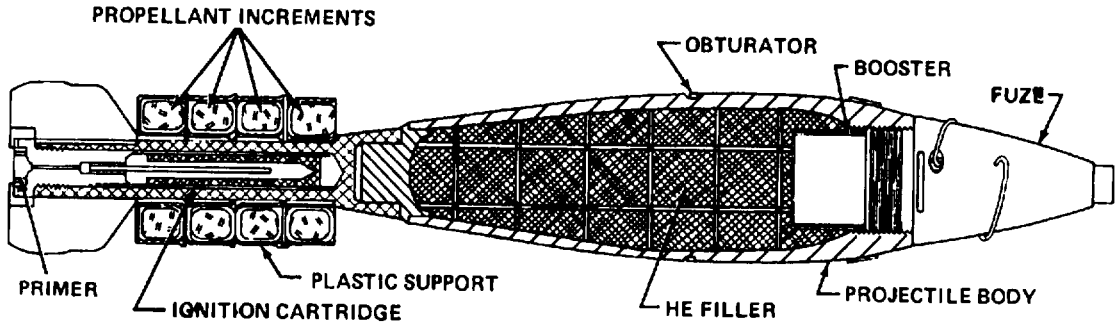

AR199479

Type Classification:

Std MSR-05756028.

Use:

This cartridge is used against personnel and materiel, providing both blast and fragmentation effects.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly four propellant charge increments, an ignition cartridge, and a percussion primer. The steel alloy body is threaded internally at the nose to accept the fuze, and threaded externally at the base to accept the fin assembly. The projectile body is filled with Comp B high explosive. The paper and brass ignition cartridge assembly contains a Percussion Primer M35, a black powder pellet, and approximately 115 grains of propellant M9. Surrounding the fin assembly are four horseshoe-shaped propelling charge M205 increments. Each propelling charge M205 increment consists of a nitrocellulose container holding approximately 400 grains of propellant M10. A protective plastic propelling charge support surrounds the four propelling charge increments.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, which ignites the propellant charge. Gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge, in turn, detonating the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect.

Tabulated Data:

Complete Round:
Type ---------- HE
Weight (as fired) ---------- 9.05 lb

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Length	20.813 in. (20.833 when assembled w/Fuze, PD M524A6)
Cannon used with	M1, M29, M29A1, M252
Projectile:	
Body material	Steel alloy
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 2.10 lb
Fuze	PD, M567; PD, M524A6 (Alternate)
Fin assembly	M24
Propelling charge	M205
Propellant	M10
Ignition cartridge	M299
Primer	Perc, M35

Temperature Limits:

Firing:	
Lower limit	
Upper limit	
Storage:	
Lower limit	-65°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container in jungle wrap; 3 containers in wirebound box
*Packing Box:	
Weight	49.4 lb
Dimensions	25-1/8 x 15-1/4 x 7-9/16 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C256
Drawing number	P9241291

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0**	215	454	504
1	438	1633	1814
2	608	2866	3184
3	750	4013	4459
4	879	4800	5333

**Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Maximum range ---------- 5,333 yd
Muzzle velocity ---------- 879 fps

Limitations:

Firing with more that two propellant increments (Charge 2) is not authorized in Mortar M1.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-3071-1

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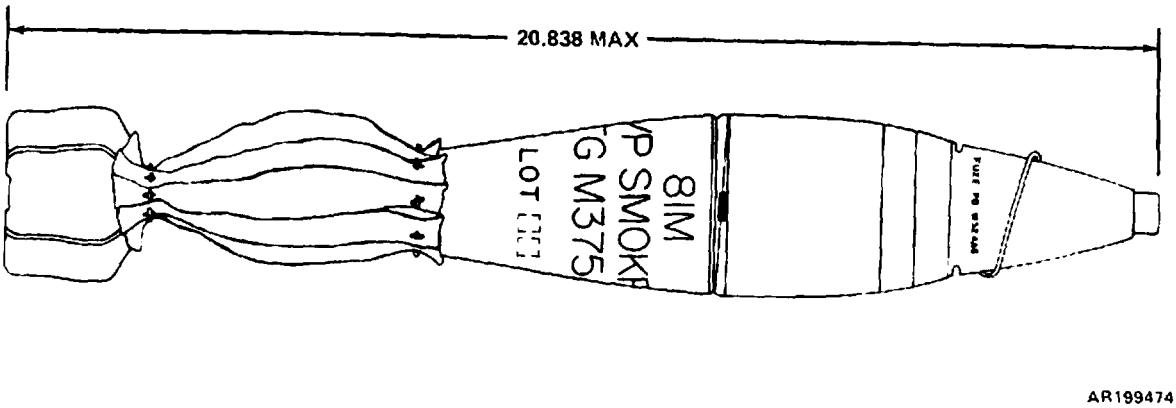
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A2 AND M375A1



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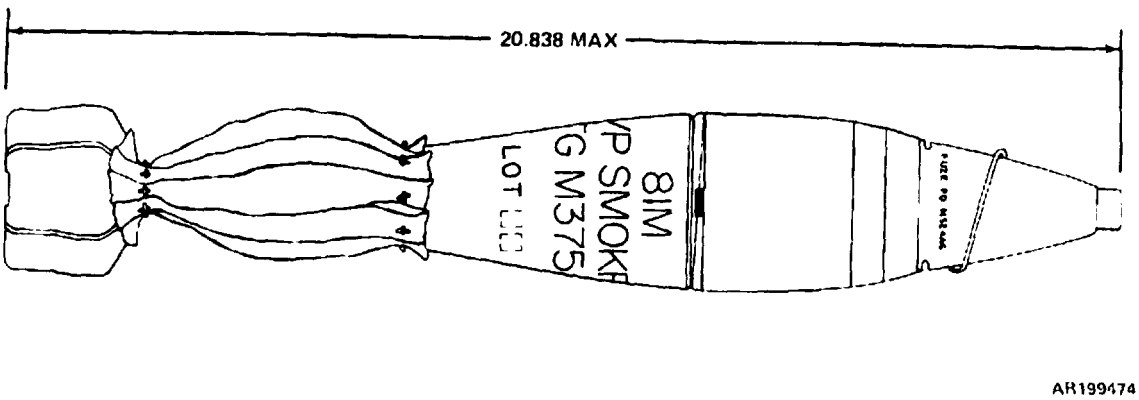

AR199474

Type Classification:

Std AMCTCM 7321, dtd 1969.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly a PD or proximity fuze a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a Percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Difference Between Models:

Models are identical except that the fin assembly with M375A2 is M170, while M375A1 uses M149 fin assembly. Also, M375A2 has a moisture-proof ignition system and propelling charge.

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Tabulated Data:

Complete Round:
- Type ---------- Smoke, WP
- Weight ---------- 9.34 lb
- Length ---------- 20.838 in.
- Cannon used with ---------- M1, M29, M29A1, M252

Projectile:
- Body material ---------- Forged steel, or cast pearlitic malleable iron
- Color ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 1.60 lb
- Fuze ---------- PD, M524 series, PD, M526 series, PD,M567, PD, M716, or Prox, M532
- Fin assembly ---------- M170 (M375A2) M149 (M375A1)

Propelling charge:
- Propellant ---------- M90A1 (A& B)
- Ignition cartridge ---------- M285 (M375A2) M66A1 (M375A1)
- Primer ---------- Percussion, M71A1 or M71A2

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (.40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- 1 round per fiber container in jungle wrap, or 1 round per plastic container in barrier bags; 3 containers in wooden box

*Packing box:
- Weight ---------- 51.0 lb
- Dimensions ---------- 26-13/16 x 13 15/16 x 6-25/32 in.
- Cube ---------- 1.4 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's

Shipping and Storage Data:

UNO serial number ---------- 0246
Quantity-distance class ---------- 1.3
Storage compatibility group ---- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C276
Drawing number ---------- 9240953 (M375A2) 9251985 (M375A1)

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0**	210	403	422
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5	656	2995	3237
6	709	3416	3740
7	764	3831	*4190*
8	814	4197	4598
9	856	4500	4932

**Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges.

Maximum range ---------- 4932 yd (4508.22 m)
Muzzle velocity ---------- 856 fps (260.9 reps)

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Limitations:

Increment A is used as Charge 1 and will be one of the increments assemble when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

Store and transport WP rounds at temperatures below 111.4°F (melting point of W). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

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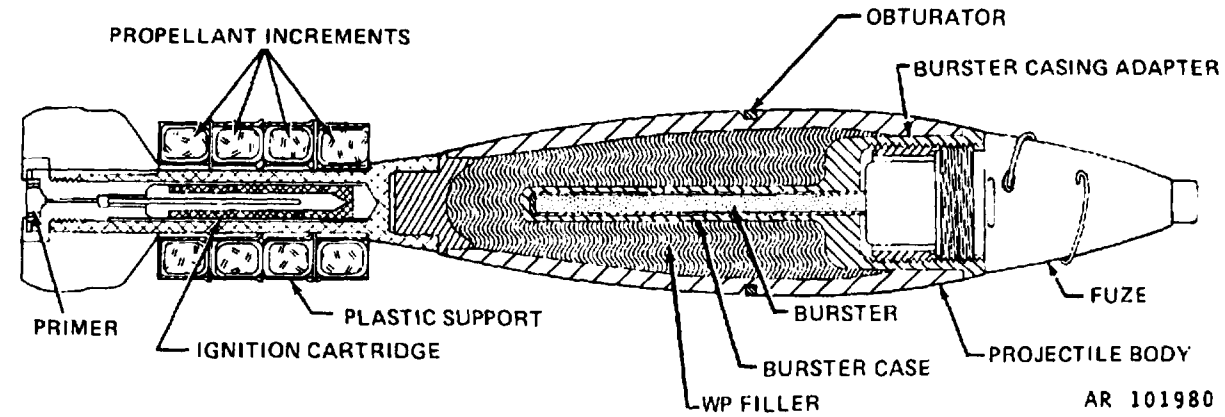
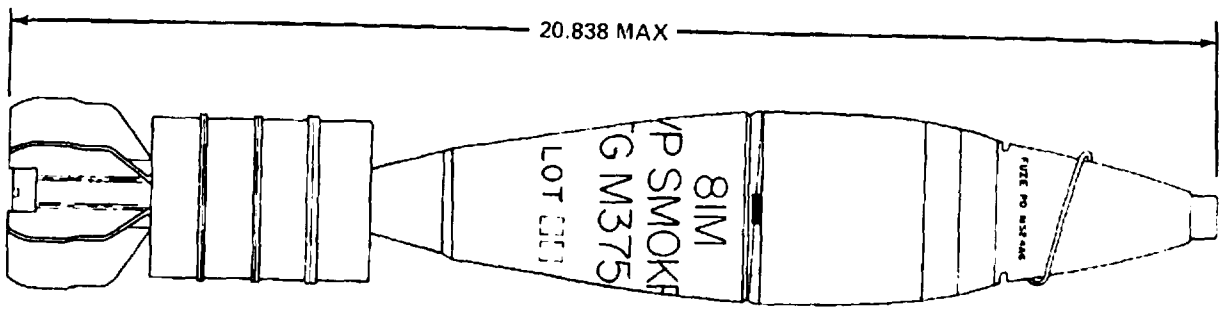
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A3





AR 101979

Type Classification:

Std MSR 05756028.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly a PD or proximity fuze a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. Surrounding the fin assembly are four horseshoe-shaped Propelling Charge M205 increments. Each Propelling Charge M205 increment consists of a nitrocellulose container holding approximately 400 grains of propellant M10. A protective plastic propelling charge support surrounds the four propelling charge increments. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

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Tabulated Data:

Complete Round:	
Type	Smoke, WP
Weight (as fired)	9.10 lb
Length	20.838 in.
Cannon used	M1, M29, M29A1, M252
Projectile:	
Body material	Forged steel, or cast pearlitic malleable iron
Color	Light green w/yellow band and light red markings
Filler andweight	WP, 1.60 lb
Faze	PD, M567; PD,M524A6 (Alternate)
Fin assembly	M24
Propelling charge:	
Propellant	M205
Ignition cartridge	M299
Primer	Percussion, M35

TemperatureLimits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container in jungle wrap, 3 containers in wirebound box
*Packing Box:	
Weight	49.4 lb
Dimensions	25-1/8 x 15-1/4 x 7-9/16 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0246
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C276
Drawing number	9294735 (M375A3)

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0*	215	454	504
1	438	1633	1814
2	608	2866	3184
3	750	4013	4459
4	879	4800	5333

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Maximum range ---------- 5,333 yd
Muzzle velocity ---------- 879 fps

Limitations:

Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space innermal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

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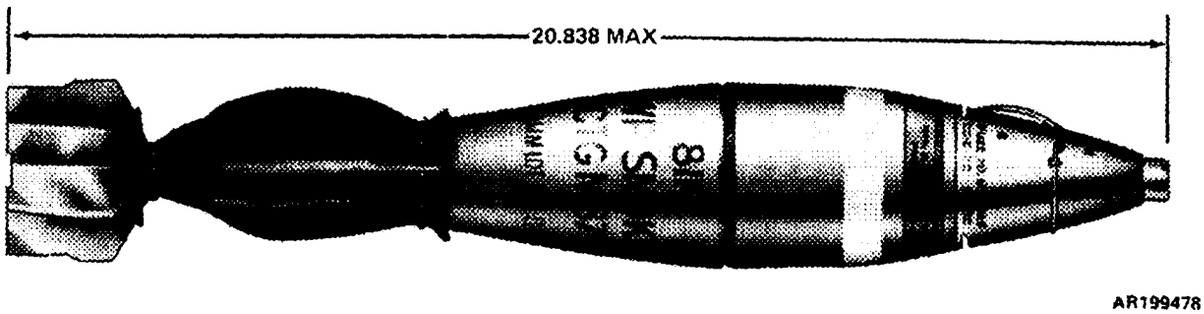
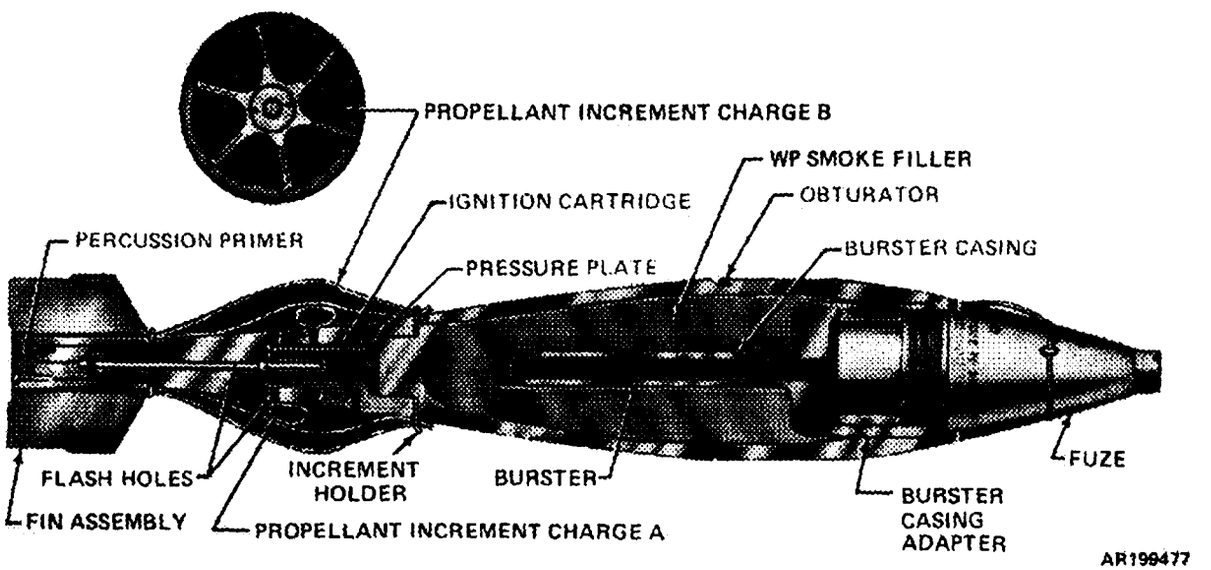
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375





Type Classification:

Std AMCTC 7379 dtd 1969.

Use

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air,

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producing a cloud of dense white smoke with some incendiary effect.

Tabulated Data:

Complete Round:
- Type ---------- Smoke, WP
- Weight ---------- 9.34 lb
- Length ---------- 20.838 in.
- Cannon used with ---------- M1, M29,& M29A1, 252

Projectile:
- Body material ---------- Forged steel or cast pearlitic malleable iron
- Color ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 1.60 lb
- Fuze ---------- PD, M524 series, PD, M526 series, PD, M567, PD, M716, or Prox, M532
- Fin assembly ---------- M149

Propelling charge:
- Propellant ---------- M90 (A&B)
- Ignition cartridge ---------- M66A1
- Primer ---------- Percussion, M71A2

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (for period not more than 3 days) (-62.2°C)
- Upper limit ---------- +160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing ---------- 1 round per fiber container in jungle wrap, or 1 round per plastic container in barrier bag; 3 containers in wooden box.

*Packing Box:
- Weight ---------- 51.0 lb
- Dimensions ---------- 26-13/16 x 13-15/16 x 6-25/32 in.
- Cube ---------- 1.4 cu ft

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0245
- Quantity-distance class ---------- (12) 1.2 H
- Storage compatibility group --- A
- DOT shipping class ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
- DOT designation ---------- 1315-C276
- DODAC ---------- 8885264
- Drawing number ---------- 8885264

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
0*	210	403	422
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5	656	2995	3237
6	709	3416	3740
7	764	3831	4190
8	814	4197	4598
9	856	4500	4932

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges.

- Maximum range ---------- 4932 yd (45 08.23 m)
- Muzzle velocity ---------- 856 fps (260.9 mps)

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

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Limitations: cont.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-3071-1

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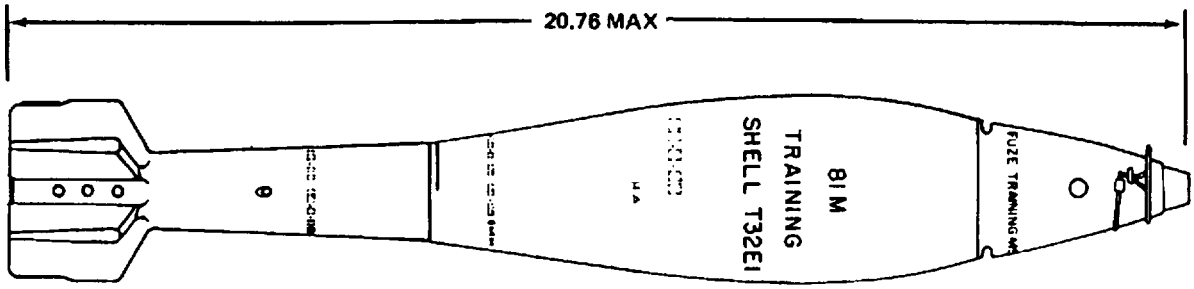
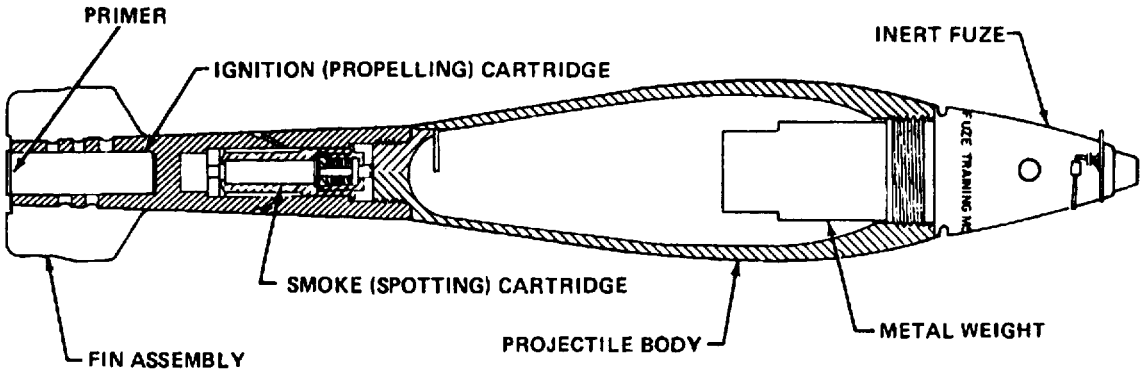
CARTRIDGE, 81 MILLIMETER: TRAINING, M445 (T32E1)



AR199472



AR199471

Type Classification:

Std OTCM 37767 dtd 1961.

Use:

This cartridge is used for training in the loading and firing of the 81mm mortar.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of a projectile body, a training fuze, and a fin assembly designed to hold an ignition cartridge and a smoke cartridge. The projectile is internally threaded at the nose to accept the training fuze, and externally threaded at the base to accept the fin assembly

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The smoke cartridge detonates on impact providing a spotting charge. The ignition and smoke cartridge are replaceable, and the round is designed for reuse.

Tabulated Data:

Complete Round:	
Type	Training
Weight	9.58 lb
Length	20.76 in.
Cannon used with	M1, M29, M29A1
Projectile:	
Body material	Bar steel
Color:	
Old	Black or blue w/white markings
New	Bronze w/white markings

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Filler and weight	Steel weight, 2.19 lb
Fuze	Inert, M531
Fin assembly	M151
Propelling charge:	
Ignition cartridge	M100
Primer	Percussion
Performance:	
Maximum range	172m (188.7yd)
Muzzle velocity	41.3 mps (135 fps)

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°C) for period not more than 4/hr/day)
*Packing	1 training cartridge, 3 fin assemblies, and 3 dummy fuzes in wooden box
*Packing Box:	
Weight	45.0 lb
Dimensions	28-5/16 x 6-13/32 x 12-11/16 in.
Cube	1.3 cu. ft

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C228
Drawing No.	P87815

Limitations:

This round is to be fired at Charge 0 only.

References:

SB 700-20
AMC-P 700-3-3

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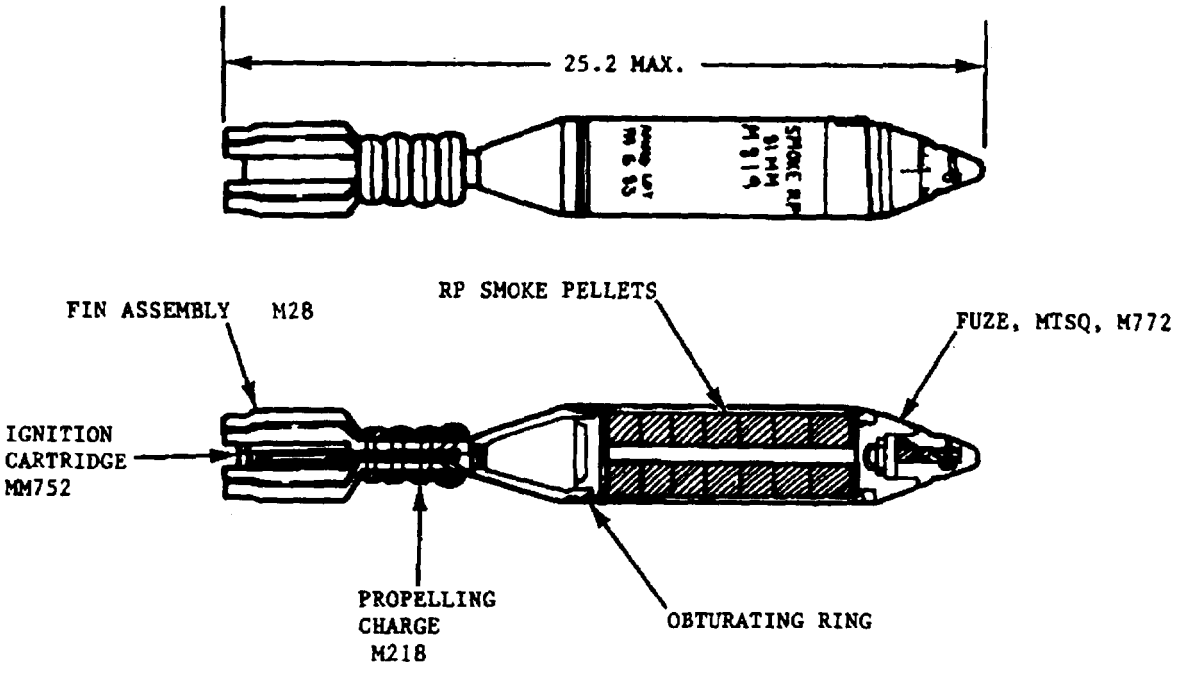
CARTRIDGE, 81 MILLIMETER: SMOKE, RP, M819



Type Classification:

Std Dec '86.

Use:

This cartridge is a smoke screen round developed for use in the M252 improved 81mm mortar system. A three round volley is used to develop the basic smoke screen.

Description:

The complete round consists of a MTSQ fuze with an expulsion charge, a projectile containing red phosphorus smoke pellets, a propelling charge comprised of four horse-shoe type propellant increments, a fin assembly, and an ignition cartridge with integral percussion primer.

Functioning:

After setting the fuze with appropriate functioning time, the cartridge is loaded into the mortar tube. The cartridge slides down the mortar tube until it reaches the firing pin in the base cap. The firing pin strikes the plunger of the percussion primer. The primer element functions and initiates the charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the fin assembly and ignites the propelling charge (horseshoe increments). The base end of the mortar tube is pressured by the hot gases generated from the burning propellant. The pressurized gas expands and propels the cartridge. The cartridge leaves the mortar tube and travels towards the target. Upon a pre-set time, the fuze functions to expel and ignite the red phosphorus smoke pellets in flight. The burning pellets produce a cloud of dense smoke after hitting the ground. A three round volley is required to develop the basic smoke screen.

Tabulated Data:

Complete Round:	
Type	Smoke, RP
Weight	10.7 lb (4.9 kg)
Length	25.5 in. (64.8 cm)
Projectile:	
Body material	Steel
Color	Green w/black markings and brown band
Filler	Red phosphorus 2.6 lb (1.2 kg)

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Components:
- Fuze ---------- MTSQ, M772
- Propelling charge ---------- M218
- Ignition cartridge ---------- M752
- Fin assembly ---------- M28

Maximum range ---------- 5000 m (16.404 ft)
Muzzle velocity ---------- 915 ft/sec (279 mps)

Temperature Limits:

Firing:
- Lower Limit ---------- -50°F (-45.5°C)
- Upper Limit ---------- +145°F (+63°C)

Storage:
- Lower Limit ---------- -50°F (-45.5°C)
- Upper Limit ---------- +160°F (+71.l°C)

*Packing: ---------- 1 round in wax-treated fiber container, 3 containers in wood box.

*Packing Box:
- Weight ---------- 66 lb (29.94 kg)
- Dimensions ---------- 30-15/16 x 13-13/16 x 6-11/16 in. (78.58 x 33.50 x 16.99 cm)
- Cube ---------- l.65 cu ft (0.05 cu m)

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0016
Quantity-distance class	(04) 1.3
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILE
DODAC	1315-C870
Drawing number	9327839

Limitations:

Cartridge cannot be fired at Charge 0 (ignition cartridge only).

Cartridge cannot be fired in the M1 mortar or above Charge 3 in the M29 mortar.

References:

AMC-P 700-3-3
SB 700-20

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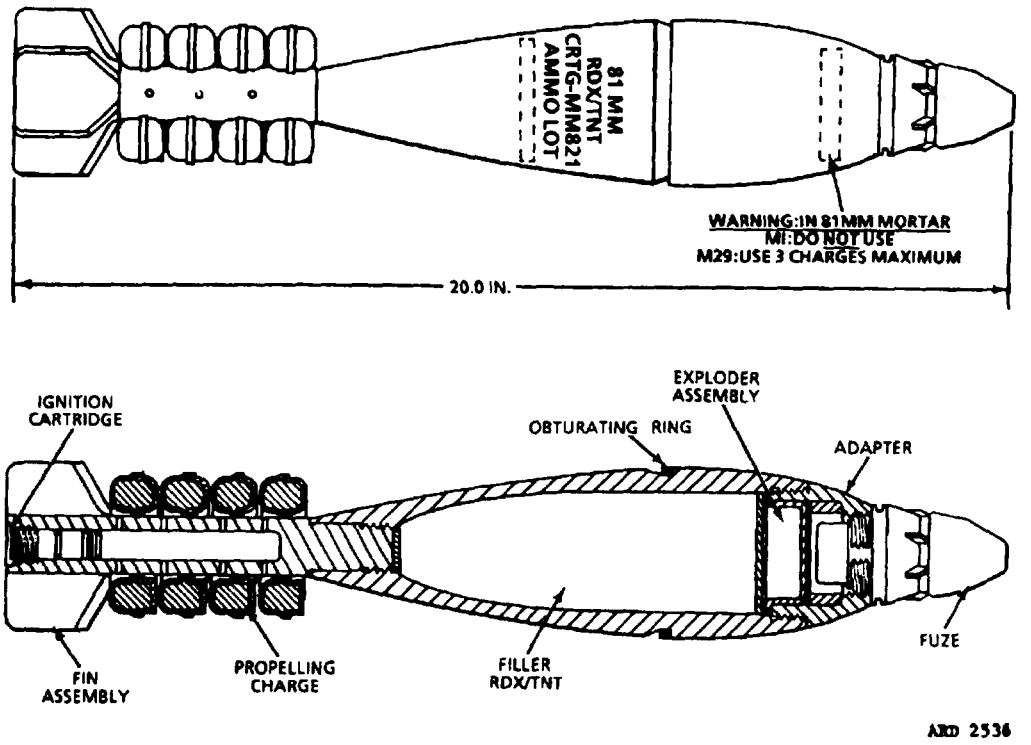
CARTRIDGE, 81 MILLIMETER: HE, M821



Type Classification:

Std DA Ltr 7/84.

Use:

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and light materiel targets.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body made of Ductile Cast Iron, is loaded with a RDX/TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propelling charge is contained in four horse-shoe felt-fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assemblyand ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions proximity, near surface, on impact, or delay depending on the fuze setting and detonates the projectile.

Tabulated Data:

Complete Round:	
Type	HE
Weight	8.96 lb
Length	20.1 in.
Assembly drawing number	9354443
Projectile:	
Body material	Ductile cast iron
Color	Olive drab w/yellow markings
Filler and weight	RDX/TNT, 1.6 lb
Components:	
Ignition cartridge	L33A1
Propellant charge MK5	4 increments (M205 propellant containers w/UK ball propellant)

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Fuze	Multi-option,
Fin assembly	TV180

Temperature Limits:

Firing:	
Lower limit	-50°F
Upper limit	+145°F
Storage:	
Lower limit	-60°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per plastic container, 3 containers per metal box
Ammo container	Dwg GD/030P/100954 (British)
Box	C374MK2, steel box Dwg. SV547A (British)

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C868

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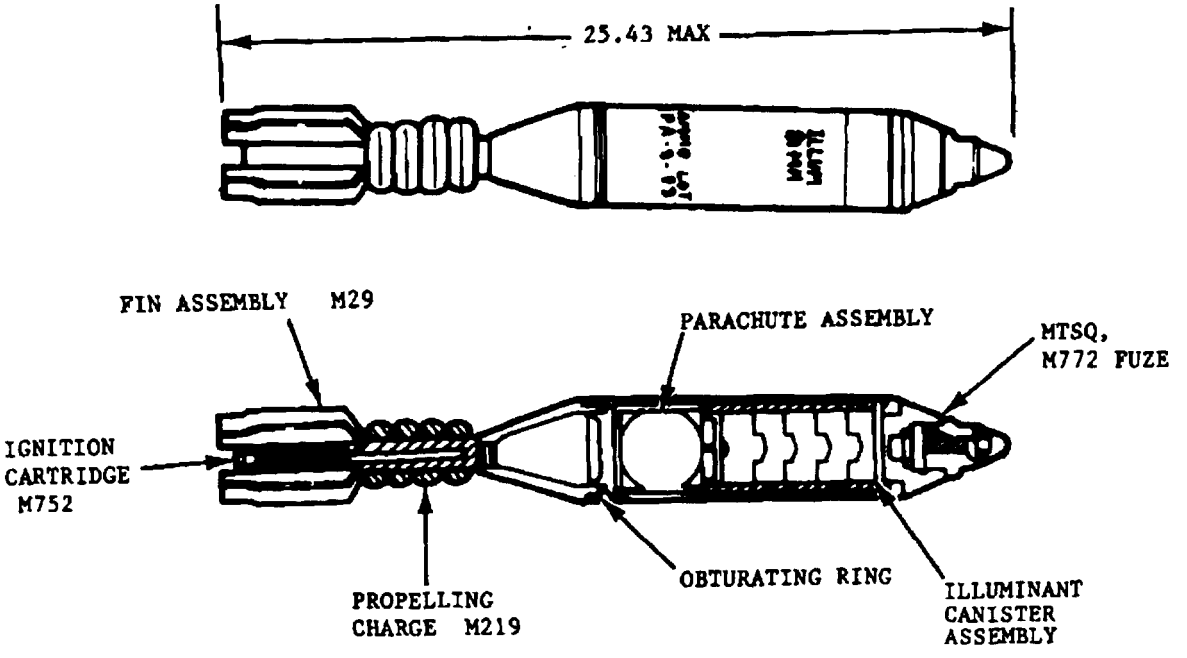
CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M853A1



AR 4025

Type Classification:

Std Dec '86.

Use:

This cartridge is an illuminating round developed for use in the M252 improved 81mm mortar system and is used for illuminating a desired point or area.

Description:

The complete round consists of a time fuze with an expulsion charge, a projectile containing an illuminant canister and parachute assembly, a propelling charge comprised of four horse-shoe type propellant increments, a fin assembly, and an ignition cartridge with integral percussion primer.

Functioning:

After setting the fuze to appropriate time, the cartridge is loaded into the mortar tube. The cartridge slides down the mortar tube until it reaches the firing pin in the base cap. The firing pin strikes the plunger of the percussion primer. The primer element functions and initiates the charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the fin assembly and ignites the propelling charge (horse-shoe increments). The base end of the mortar tube is pressurized by the hot gases generated from the burning propellant. The pressurized gas expands and propels the cartridge. The cartridge leaves the mortar tube and travels towards the target. Upon a pre-set time, the fuze functions to expel and ignite the illuminant canister assembly. The parachute deploys to slow the descent of the illuminant canister assembly. The burning candle provides a minimum of 600,000 candle power illumination for at least 60 seconds.

Tabulated Data:

Complete Round:

Type	Illuminating
Weight	8.8 lb (4 kg)
Length	25.3 in. (64.3 cm)

Projectile:

Body Material	Aluminum
	White w/black markings
Filler	Illuminant, 1.4 lb (0.6 kg)

Components:

Fuze	MTSQ, M772
propelling charge	M219
Ignition cartridge	M752
Fin assembly	M29

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Maximum range	5000m (16,404 ft) (burst)
Muzzle velocity	1020 ft/sec (311 mps)

Temperature Limits:

Firing:	
Lower limit	-50°F (-45.5°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-60°F (-51.1C)
Upper limit	+160°F (+71.1°C)
*Packing:	1 round in wax-treated fiber container, 3 containers in wood box
*Packing Box:	
Weight	60 lb (27.2 kg)
Dimensions	30-15/16 x 13-13/16 x 6-11/16 in. (76.6 x 35.1 x 17 cm)
Cube	1.65 cu ft (0.05 cu)

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0171
Quantity-distance class	(04) 1.2
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILE
DODAC	1315-C871
Drawing number	9152621

Limitations:

Cartridge cannot be fired at Charge 0 (ignition cartridge only).

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 mortar.

References:

AMC-P 700-3-3
SB 700-20

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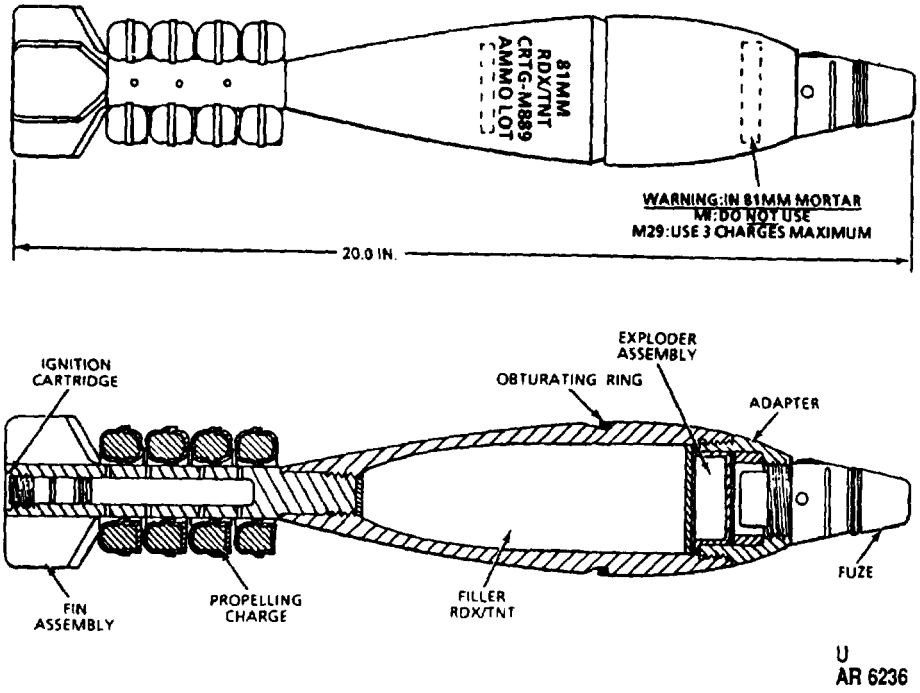
CARTRIDGE, 81 MILLIMETER: HE, M889



Type Classification:

Std - DA Ltr 7/84.

Use:

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and light materiel targets.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body, made of ductile cast iron, is loaded with a RDX/TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propelling charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on impact and detonates the projectile.

Tabulated Data:

Complete Round:

Type	HE
Weight	8.96 lb
Length	20.0 in.
Assembly drawing number	9354444

Projectile:

Body material	Ductile cast iron
Color	Olive drab w/yellow markings
Filler and weight	RDX/TNT, 1.6 lb

Components:

Ignition cartridge	L33A1
Propellant charge MK5	4 increments (M205 propellant containers with UK ball propellant)

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Fuze	PD, M935
Fin assembly	TV180

Temperature Limits:

Firing:	
Lower limit	-50°F
Upper limit	+145°F
Storage:	
Lower limit	-60°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per plastic container, 3 containers per metal box
Ammo container	Dwg. GD/030P/100954 (British)
Box	C374 MK2, steel box Dwg. SV547A (British)

***NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C869

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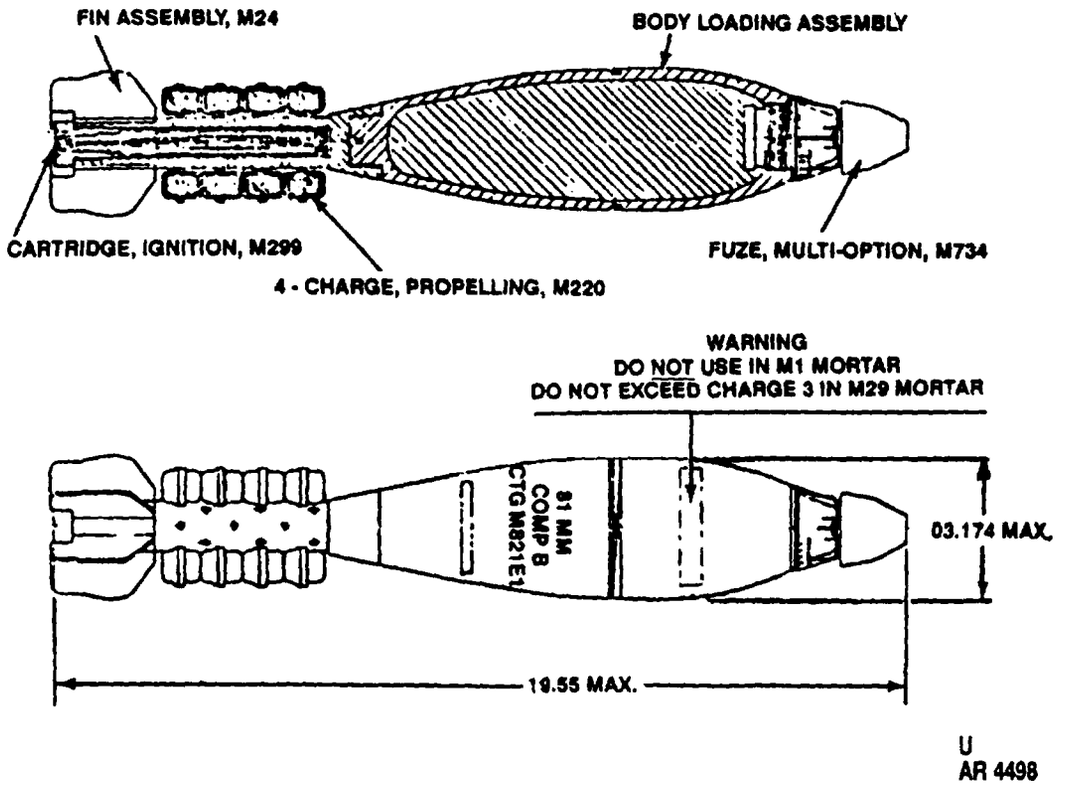
CARTRIDGE, 81 MILLIMETER: HE, M821A1 WITH FUZE, MULTI-OPTION, M734



Type Classification:

TBD

Use:

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and material providing both blast and fragmentation effect.

Description:

The complete round consists of a fuze, four increment charges, fin assembly, ignition cartridge, and shell body. The shell body, made of forged steel material, is loaded with a Composition B (RDX/TNT) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge which ignites the propellant charge. Gases from the burning propellant expel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect. The fuze functions proximity near surface, on impact, or delay depending on the fuze setting and detonates the projectile.

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Difference Between Models:

The M821A1 cartridge is produced using the Americanized TDP based on the M821 cartridge.

Tabulated Data:

Complete Round:
- Type ---------- HE
- Weight ---------- 9.22 lb
- Length ---------- 19.55 in.

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 2.05 lb

Components:
- Ignition cartridge ---------- M299
- Propellant charge ---------- M220
- Primer ---------- M55 Percussion
- Fuze ---------- Multi-Option, M734
- Fin assembly ---------- M24

Temperature Limits:

Firing:
- Lower limit ---------- -50°F
- Upper limit ---------- +145°F

Storage:
- Lower limit ---------- -60°F
- Upper limit ---------- +160°F

Packing ---------- 1 round per wax treated fiber container; 3 containers in wirebound box
Weight ---------- 42 lb
Dimensions ---------- 23-11/16 x 13-3/8 x 5-5/16 in.
Cube ---------- cu ft

Shipping and Storage Data:

Quantity-distance class ---------- (08) 1.2
Storage compatibility group ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC---------- 1315-C868
NSN---------- 1315-01-285-6416
Drawing number ---------- 12630672

Limitations:

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 Mortar.

References:

TM 9-1015-249-10
SB 700-20
AMC-P 700-3-3
DOD Consolidated Ammunition Catalog
TM 9-1300-251-20

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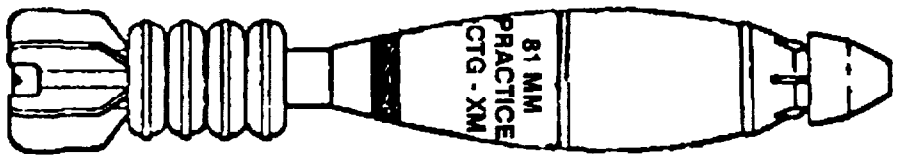
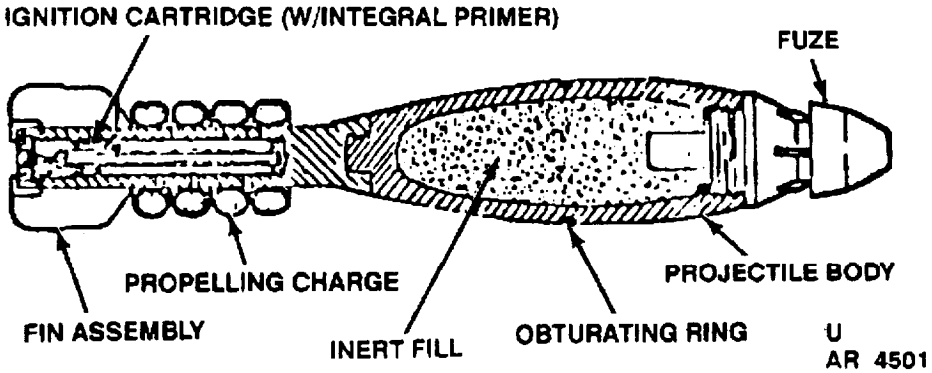
CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE M879 WITH FUZE, PD, M751





Type Classification:

TBD

Use:

This cartridge is a full range training round for use in the M252 improved 81mm mortar system.

Description:

This cartridge consists of a PD (practice) fuze, an inert loaded projectile body, fin assembly, four propellant increments, obturating ring and an ignition cartridge (with integral primer). The cartridge with the M751, PD fuze resembles the 81MM M821 HE cartridge. These practice cartridges are ballistic matches to the HE cartridges and produce a similar signature (flash, audible sound, and smoke cloud) upon impact on the ground.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge which ignites the propellant charge. Gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The acceleration arms the fuze. The cartridge travels down-range and impacts the target. The fuze functions on impact. A pyrotechnic smoke charge in the fuze produces a flash, an audible sound, and a smoke cloud.

Tabulated Data:

Complete Round:	
Type	Practice (full range)
Weight	9.40 lb
Length	19.55 in.
Projectile:	
Body material	Steel
Color	Blue w/white markings and 1 brown ban
Filler and weight	Hydrocal (inert), 2.05 lb
Components:	
Ignition cartridge	M299 (with integral primer)
Propellant charge	M220
Fuze	PD, M751
Fin assembly	M24
Maximum range	5700 m
Maximum muzzle velocity	305 mps

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Temperature Limit

Firing:	
Lower limit	0°F
Upper limit	+110°F
Storage:	
Lower limit	-45°F
Upper limit	+145°F
Packing	1 cartridge per wax treated fiber container; 3 containers in metal box
Weight	x lb
Dimensions	25-1/16 x 13-13/16x 6-11/16 in.
Cube	1.34 cu ft

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	C
DOT designation	AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE
DODAC	1315-C875
NSN	1315-01-200-4223
Drawing number	9381430

Limitations:

None.

References:

TM 9-1015-249-10
SB 700-20
AMC-P 700-3-3
DOD Consolidated Ammunition Catalog
TM 9-1300-251-20

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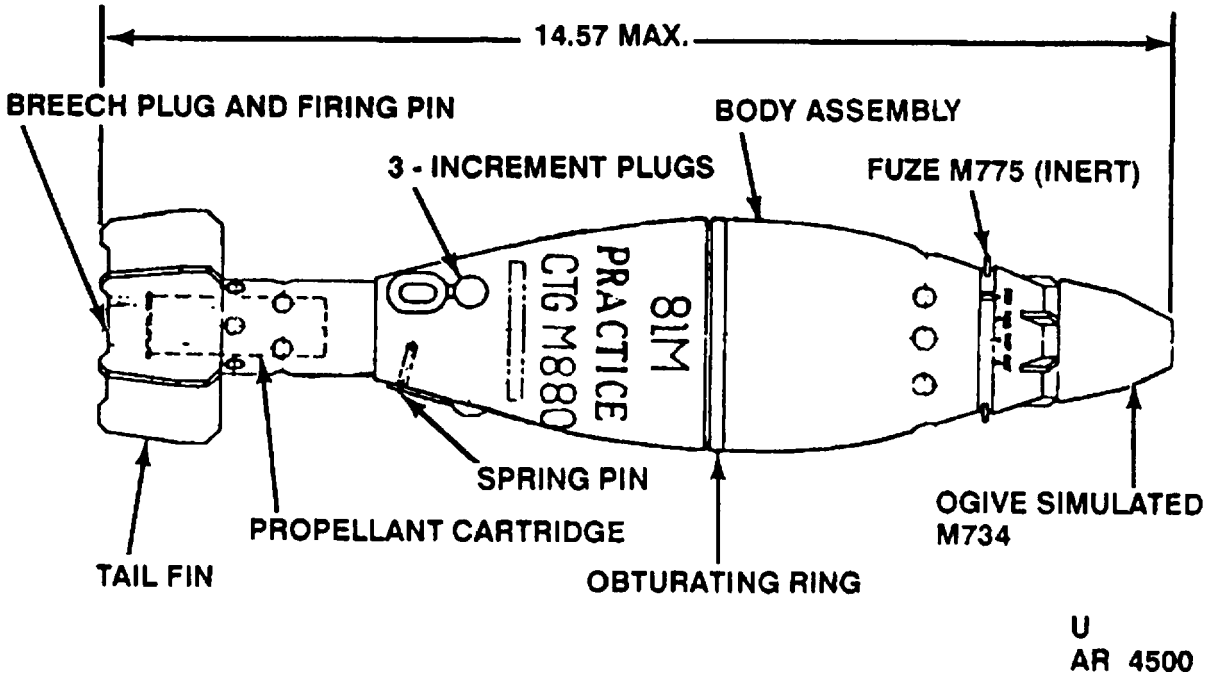
CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE (SR), M880 WITH FUZE, PD, M751



Type Classification:

Std

Use:

This cartridge is a short range (SR) training round for use in the M252 improved 81mm mortar system.

Description:

This cartridge consists of a PD (practice) fuze, hollow projectile body with vent holes, fin assembly, three plastic plugs (simulations of propellant charge increments), obturating ring and ignition cartridge with percussion primer.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition charge and the gases generated by the ignition cartridge propel the cartridge out of the barrel. The distance of the cartridge traveling downrange depends on the number of plastic plugs removed (before firing) and the amount of gas allowed to escape from the barrel through the projectile body. The fuze functions on impact with the ground or target. A pyrotechnic smoke cartridge in the fuze produces a flash, an audible sound, and a cloud of smoke (simulation of the HE cartridge function).

Tabulated Data:

Complete Round:	
Type	Practice (short range)
Weight	6.84 lb
Length	14.5 in.
Projectile:	
Body material	Steel
Color	Blue w/white markings and 1 brown band
Filler	None (hollow body)
Fuze	PD, M775 (practice)
Maximum range	490 m (538 yd)
Maximum muzzle velocity	73 mps

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Temperature Limits:

Firing:	
Lower limit	0°F
Upper limit	+110°F
Storage:	
Lower limit	-45°F
Upper limit	+145°F
Packing	1 cartridge per fiber container; 8 containers per wireboundbox
Weight	77 lb (34.47 kg)
Dimensions	19-1/2 x 16 x 9-1/8 in.
Cube	x cu ft

Shipping and Storage Data:

UNO serial number	0012
Quantity-distance class	1.4
Storage compatibility group	S
DOT shipping class	C
DOT designation	AMMUNITION FOR CANNON WITH INERT PROJECTILE
DODAC	1315-C876
NSN	1315-01-216-7071
Drawing number	9381430

Limitations:

None.

NOTE: After the round functions it can be retrieved and refurbished as indicated in TM 9-1315-252-12&P.

References:

TM 9-1015-249-10
SB 700-20
AMC-P 700-3-3
DOD Consolidated Ammunition Catalog
TM 9-1300-251-20

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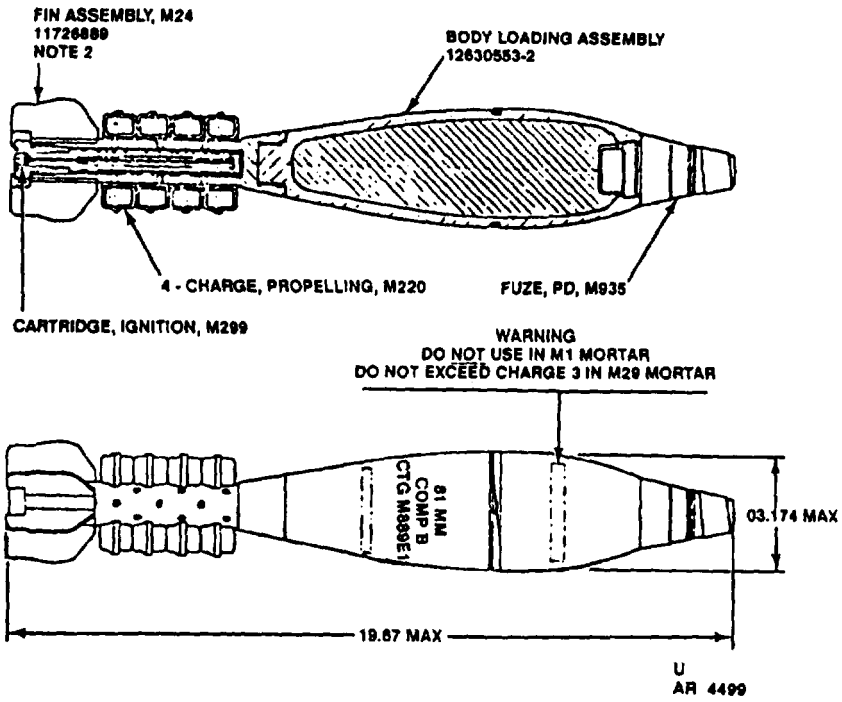
CARTRIDGE, 81 MILLIMETER: HE, M889A1 WITH FUZE, PD, M935



Type Classification:

TBD

Use:

This cartridge is a high explosive round developed for use in the M252 Improved 81mm mortar system. It is intended for use against personnel and material, providing both blast and fragmentation effect.

Description:

The complete round consists of a fuze, increment charges, fin assembly, ignition cartridge, and shell body. The shell body, made of forged steel material, is loaded with a Composition B (RDX/TNT) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge which ignites the propellant charge. Gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect. The fuze functions either superquick or delay action (0.05 sec) depending on the fuze setting and detonates the projectile.

Tabulated Data:

Complete Round:	
Type	H E
Weight	9.22 lb
Length	19.67 in.
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 2.05 lb
Components:	
Ignition cartridge	M299
Propelling charge	M220
Primer	Percussion, M35
Fuze	Point detonating, M935

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Fin assembly ---------- M24

Temperature Limits:

Firing:
Lower limit ---------- -50°F
Upper limit ---------- +145°F
Storage:
Lower limit ---------- -60°F
Upper limit ---------- +160°F

Packing ---------- 1 round per wax treated fiber container; 3 containers in wirebound box
Weight ---------- 41 lb
Dimensions ---------- 23-11/16 x 13-3/8 x 5-5/16 in.
Cube ---------- cu ft

Shipping and Storage Data:

Quantity-distance class ---------- 1.2 (08)
Storage compatibilitygroup ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C869
NSN ---------- 1315-01-286-1385
Drawing number- ---------- 12630535

Limitations:

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 mortar.

Difference Between Models:

The M889A1 cartridge is produced using the Americanized TDP based on the M889 cartridge.

References:

TM 9-1015-249-10
SB 700-20
AMC-P 700-3-3
DOD Consolidated Ammunition Catalog
TM 9-1300-251-20

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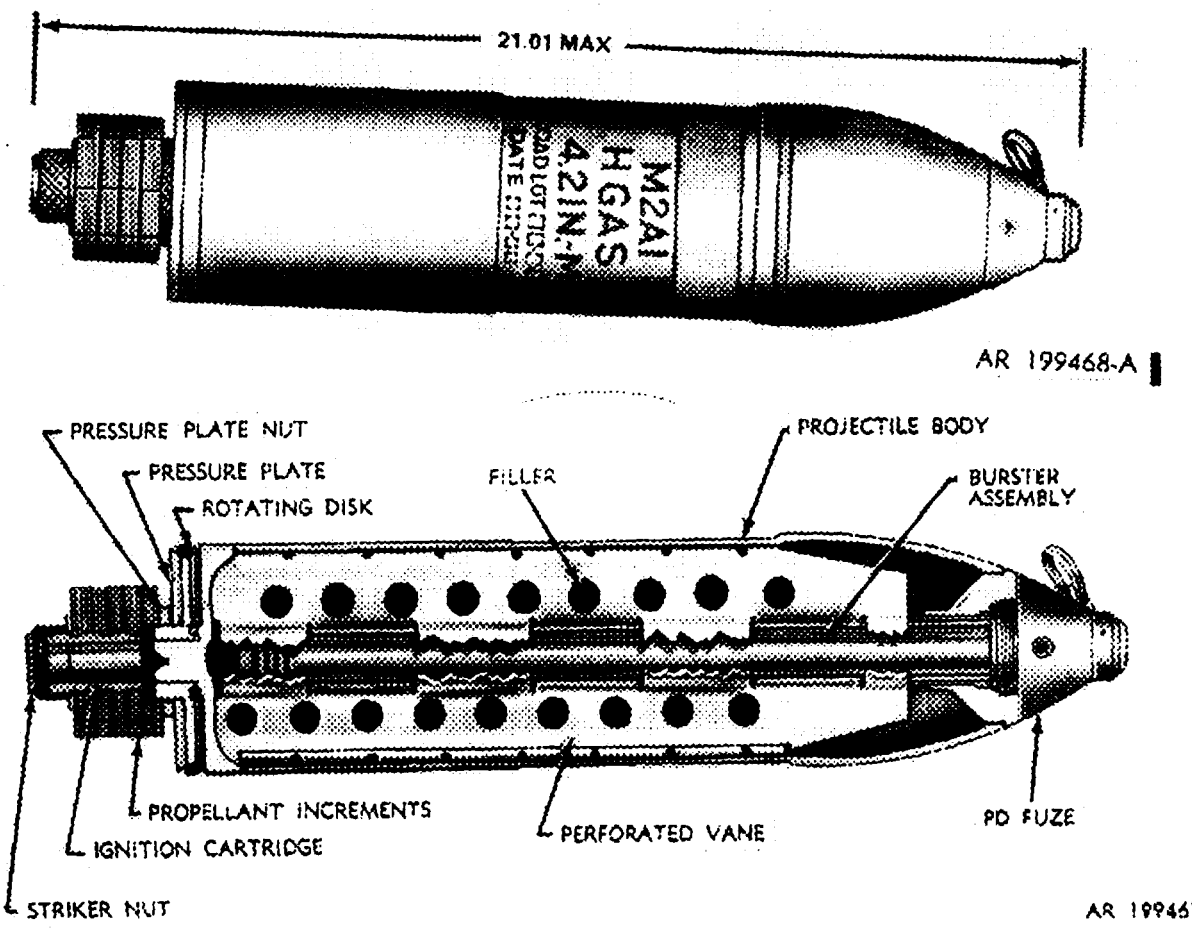
CARTRIDGE, 4.2-INCH: GAS, M2A1 AND M2



Type Classification:

M2A1: Std OTCM 36841 dtd 1958. M2: OBS MSR 05776015.

Use:

This cartridge is used for casualty effect and may be filled with either non-persistent gases CNB, CNS, CK or CG, or persistent gases H, HD or HT.

Description:

The complete round consists of a projectile body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and is designed to accommodate the burster tube that extends from the fuze. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. The perforated vane causes the liquid filler to rotate with the projectile to reduce the possibility of erratic flight. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the gas filler.

Difference Between Models:

Cartridge M2 differs slightly from Cartridge M2A1 in the design of the obturating mechanism.

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Tabulated Data:

Complete Round:	
Type	Agent
Weight	24.67 lb
Length	21.01 in.
Cannon used with	M2,M30
Projectile:	
Body material	Steel
**Color:	
Persistent	Gray w/2 green bands and green markings
Non-persistent	Gray w/1 green band and green markings
Filler and weight	Gas, 5.75 to 8.00 lb
Ignition cartridge	M2*
Propelling charge	M6*
Fuze	PD, M8 (with M14 burster)
Performance (full charge):	
Maximum range	4879 yd (4,460 m)
Muzzle velocity	839 fps (255.8 mps)

*NOTE: See separate data sheets.

**NOTE: Renovated or newly manufactured projectile. (Post 1976) will be marked with one green band and, if burstered, one yellow band.

Temperature Limits:

Firing	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (-52.0°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1 °C) (for period not more than 4hr/day)
***Packing	1 round in fiber container; 2 containers in wooden box
***Packing Box:	
Weight	75.0 lb
Dimensions	27-1/16 x 11- [illegible] in.
Cube	1.3 cu ft

***NOTE: see DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0020
Quantity-distance class	(12) 1.2
Storage compatibility group	K
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH GAS PROJECTILES
DODAC	CNB, CNS, CNS-1315-C701 H, HD, HT-1315-C703
Drawing number	75-1-284

Limitations:

Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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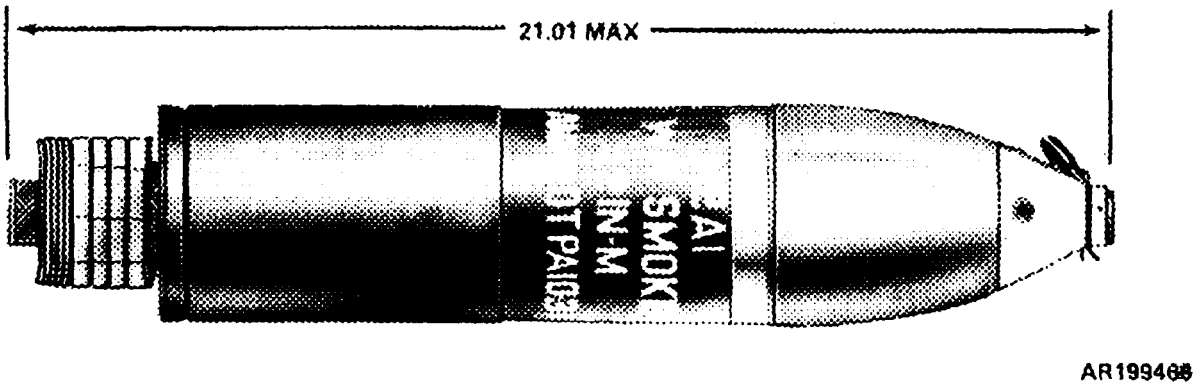
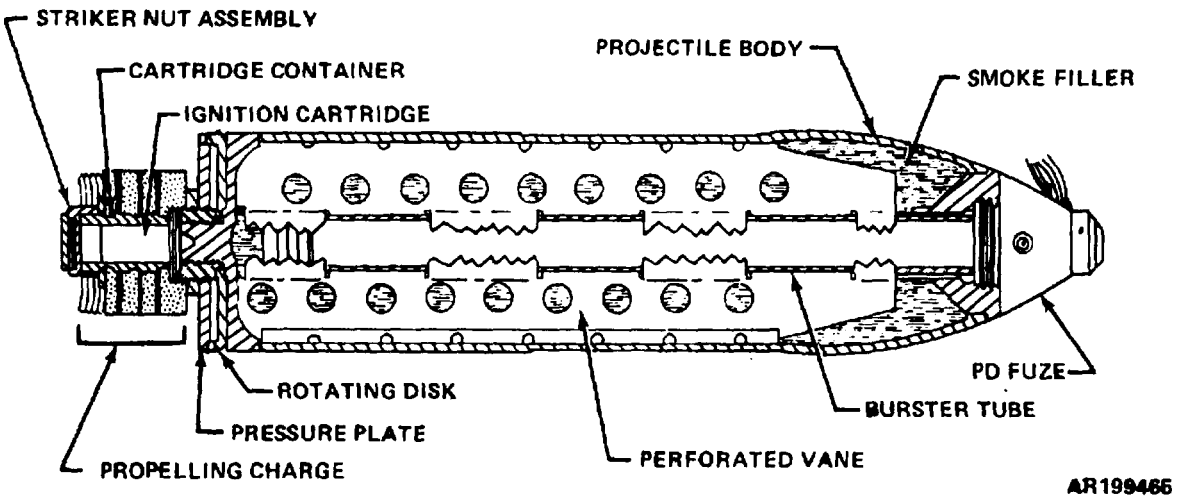
CARTRIDGE, 4.2-INCH: SMOKE, PWP OR WP, M2A1 & M2





Type Classification:

OBS 11756003.

Use:

This cartridge is used against personnel and materiel as an incendiary device, and to produce a screening smoke.

Description:

The complete round consists of a projectile body a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and designed to accommodate the burster tube that extends from the fuze. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. On impact, the functioning of the fuze detonates the burster charge which shatters the projectile casing, dispersing the filler. On contact with the air, the WP (or PWP) filler ignites creating a dense white smoke with some incendiary effect.

Difference Between Models:

Cartridge M2 differs slightly from cartridge M2A1 in the design of the obturating mechanism.

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Tabulated Data:

Complete Round:
- Type ---------- Smoke
- Weight ---------- 24.91 lb
- Length ---------- 21.01 in.
- Cannon used with ---------- M2, M30

Projectile:
- Body material ---------- Steel
- Color ---------- Gray w/yellow band and yellow markings
- Filler and weight ---------- WP,7.50 lb

Components:
- Ignition cartridge ---------- M2*
- Propelling charge ---------- M6*
- Fuze ---------- PD, M8 (with M14 burster)

Performance (full charge):
- Maximum range ---------- 4879yd (4,460 m)
- Muzzle velocity ---------- 839 fps (255.8 mps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
- Lower limit ---------- 40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for not more than 4 hr/day)

**Packing ---------- 1 round in fiber container; 2 containers in wooden box

**PackingBox:
- Weight ---------- 70 lb
- Dimensions ---------- 27-1/6 x 11-1/8 x 7-7/32 in.
- Cube ---------- 1.3 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
Quantity-distance class ---------- (12) 1.2
Storage compatibility group ---- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C708
Drawing number ---------- 75-1-284

Limitations:

Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space innermal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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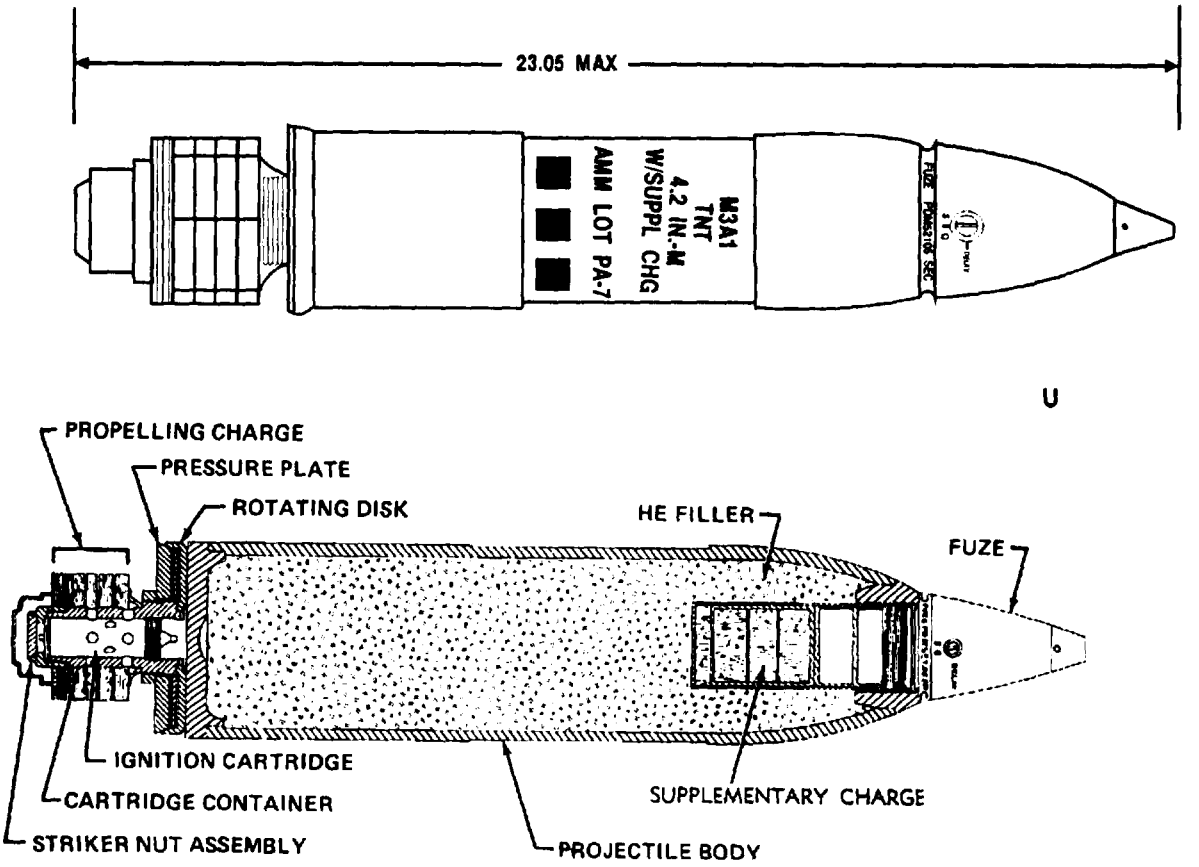
CARTRIDGE, 4.2-INCH: HE, M3A1 & M3



Type Classification:

OBS 11756003.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body a fuze, and a tail assembly. The steel body is designed to accommodate an impact, delay, or proximity fuze. A deep fuze well in the nose, is fitted with a supplementary charge of TNT. This charge is removed to accommodate certain proximity fuzes. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. The functioning of the fuze detonates the supplementary charge (when used) and the high explosive charge. Depending on the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Difference Between Models:

The fuze well on the M3 cartridge is designed to accommodate the burster tube of the M9 fuze. In addition, the physical dimensions of the two models are slightly different.

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Tabulated Data:

Complete Round:
- Type ---------- HE
- Weight ---------- 26.20 lb
- Length ---------- 23.05 in.
- Cannon used with ---------- M2, M30

Projectile:
- Body material ---------- Steel
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- TNT, 7.80 lb
- Supplementary charge -------- TNT, 0.365 lb

Components:
- Ignition cartridge ---------- M2*
- Propelling charge ---------- M6*
- Fuze: M3 ---------- PD, M9
- M3A1 ---------- PD, M557, MTSQ, M520 series, M564; Prox. M513 series

Performance (full charge):
- Maximum range ---------- 5043 yd (4,610 m)
- Muzzle velocity ---------- 845 fps (258 reps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

**Packing ---------- 1 round in fiber container; 2 fiber containers in wooden box

**Packing Box:
- Weight ---------- 76 lb
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-3/8 in.
- Cube ---------- 1.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0006
Quantity-distance Class ---------- 1.1
Storage compatibility group ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C704
Drawing number ---------- 75-l-285

Limitations:

Minimum charge for firing cartridge M3A1 with a proximity fuze is 10 increments.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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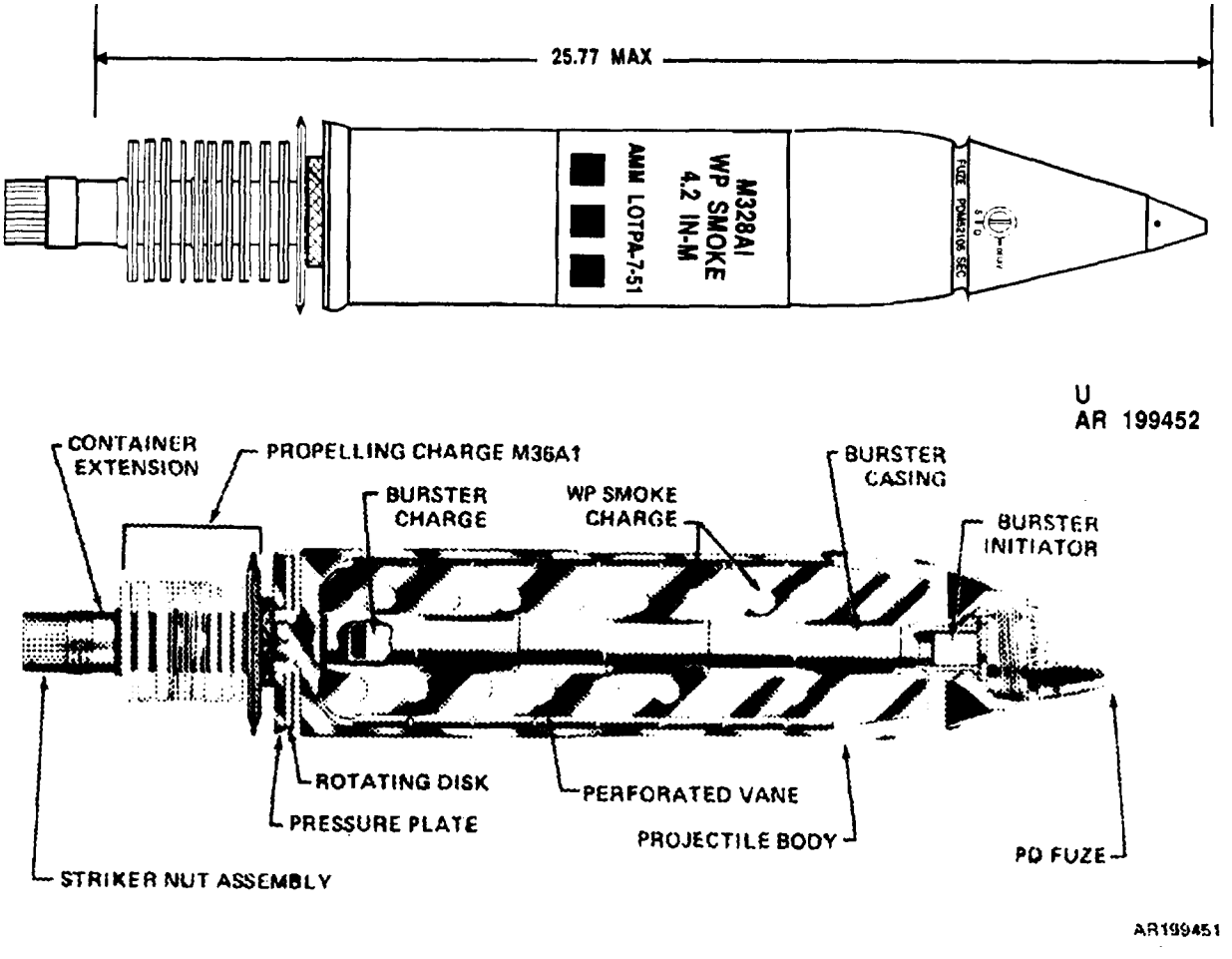
CARTRIDGE, 4.2-INCH: SMOKE, WP, M328A1 AND M328



Type Classification:

Std AMCTC 124 dtd 1962 (M328A1). CON 11756003 (M328).

Use:

These cartridges are used to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze, and a tail assembly. The steel body contains a perforated vane assembly and is designed to accommodate a burster casing containing an initiator charge and a burster charge. Cartridges loaded prior to 1963 have a tetrytol burster charge; those loaded after 1963 use a Composition B burster charge. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a striker nut assembly, a cartridge container and extension, and an ignition cartridge.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin, imparted to the projectile as it leaves the weapon, stabilizes it in flight. The PD fuze functions on impact, activating the burster initiator which detonates the burster charge. The burster charge shatters the projectile body, dispersing the WP filler. White phosphorous ignites on contact with the air, producing a dense white smoke with some incendiary effect.

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Difference Between Models:

Cartridge M328 is similar to M328A1 as illustrated except that M328 uses ignition cartridge M2 and propelling charge M36. See separate data sheets for details of ignition cartridges M2 and M2A2, and propelling charges M36 and M36A1.

Tabulated Data:

Complete Round:

Type	WP
Weight	28.66 lb
Length	25.77 in.
Cannon used with	M2, M30

Projectile:

Body material	Steel
Color:	
Old	Gray w/yellow band and yellow markings
New	Light green w/yellow band and light red markings
Filler and weight	WP, 8.4 lb (M328A1). WP, 7.5 lb (M328)

Components:

	M328A1	M328
Ignition cartridge	M2A2*	M2*
Propelling charge	M36A1*	M36*
Burster assembly	M35	M35
Burster initiator	M13	M13
Fuze	PD, M48A3 (w/adapter), M521	PD M48A3 (w/adapter)

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range	6,180 yd (5,650 m)
Muzzle velocity	981 fps (299 reps)

Temperature Limits:

Firing:

Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)

Storage:

Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1 C) (for period not more than 4 hr/day)

**Packing	1 round in fiber container; 1 container in wooden box.
**Packing Box:	
Weight	76 lb
Dimensions	31-15/16 x 11-13/16 x 7-3/8 in.
Cube	1.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C708
Drawing number	8797829

Limitations:

Short rounds may occur when firing with fewer than 10 increments.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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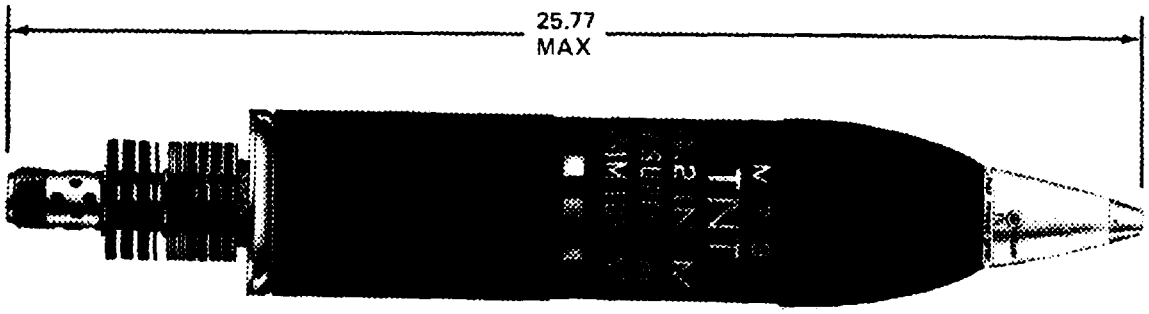
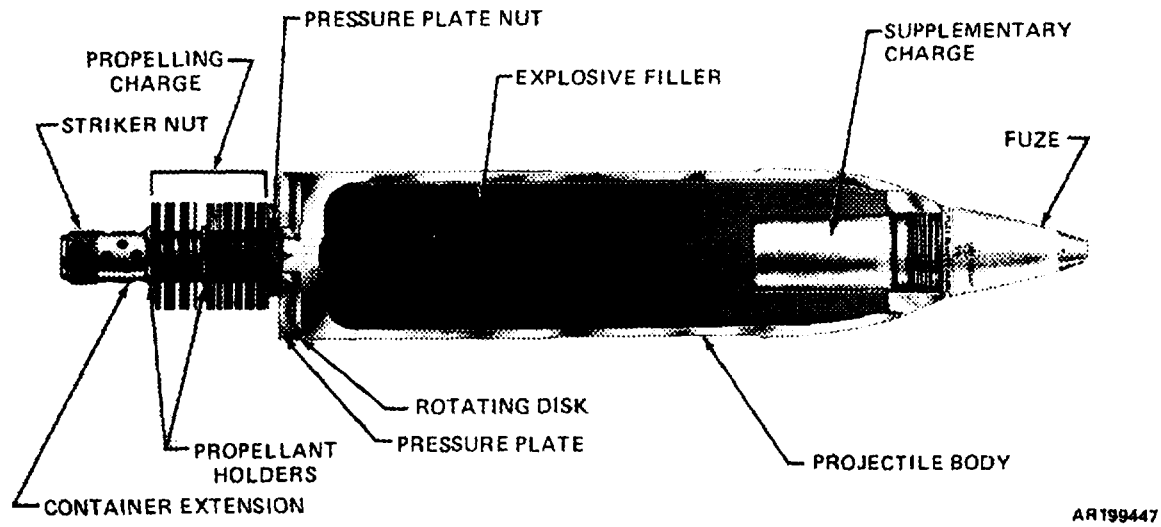
CARTRIDGE, 4.2-INCH: HE, M329 AND M329B1



AR199448



AR199447

Type Classification:

Std AMCTC 124 dtd 1962 (M329B1). CON 11756003.

Use:

These cartridges are used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fuze, and a tail assembly. The steel body is designed to accommodate an impact, delay, or proximity fuze. A deep fuze-well in the nose is fitted with a supplementary charge of TNT; this charge is removed to accommodate deep-intrusion proximity fuzes. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin, imparted to the projectile as it leaves the weapon, stabilizes it in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Difference Between Models:

The M329B1 has a projectile body made from a forging with an integral base.

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Tabulated Data:

Complete round:
- Type ---------- HE
- Weight ---------- 27.07 lb
- Length ---------- 25.77 in.
- Cannon used with ---------- M2, M30

Projectile:
- Body\material ---------- Steel tube
- Color---------- Olive drab w/yellow markings
- Filler and weight ---------- TNT 7.08 lb
- Supplementary charge -------- TNT 0.365 lb

Components:
- Ignition cartridge ---------- M2*
- Propelling charge ---------- M36*
- Fuzes----------PD, M557, M739, MTSQ, M520 series, M564, Prox, M513 series

*NOTE: See separate data sheets.

Performance (full charge)
- Maximum range ---------- 5929 yd (5420 m)
- Muzzle velocity ---------- 964 fps (294 mps)

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

**Packing ---------- 1 round in fiber container; 2 containers in wooden box.

**Packing Box:
- Weight ---------- 76 lb
- Dimensions ---------- 31-15/16 x 11-13/16 x 7-3/8 in.
- Cube ---------- l.6 cu ft

**NOTE: See DOD Consolidatd Ammunition Catalog for complete packing data including NSN's.

Storage and Shipping Data:

UNO serial number ---------- 0006
Quantity-distance class ---------- 1.1
Storage compatibility group ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITIONFOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C704 w/fuze
DODAC ---------- 1315-C705 w/o fuze
Drawing number ---------- (M329), 8863682 (M329B1)

Limitations:

Short rounds may occur when firing with less than seven increments. Minimum charge for firing with a proximity fuze is 10 increments.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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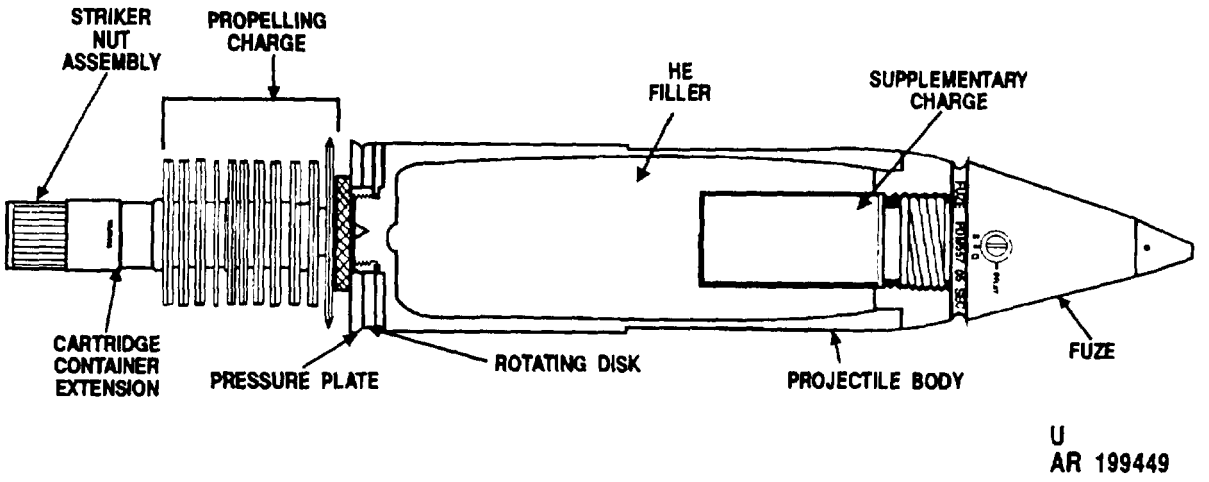
CARTRIDGE, 4.2-INCH: HE, M329A1



Type Classification:

Std (LCC-B) 01756003.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fuze, and a tail assembly. The steel body is designed to accommodate an impact, delay, or proximity fuze. A deep fuze well in the nose is fitted with a supplementary charge of TNT; this charge is removed to accommodate certain proximity fuzes. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin, imparted to the projectile as it leaves the weapon, stabilizes it in flight. The functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending on the type of fuze used, the projectile bursts either over or on target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete Round:	
Type	HE
Weight	27.07 lb
Length	25.79 in. (65.51 cm)
Cannon used with	M2, M30
Projectile:	
Body material	Steel tube
Color	Olive drab w/white markings
Filler and weight	TNT, 7.08 lb (3.21 kg)
Supplementary charge	TNT, 0.365 lb

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Components:
- Ignition cartridge ---------- M2A2*
- Propelling charge ---------- M36A1*
- Fuze ---------- PD, M557; MTSQ, M520 series or M564, Prox, M513 series

*NOTE: See separate data sheets.

Performance (full charge):
- Maximum range ---------- 6180 yd (5650 m)
- Muzzle velocity ---------- 981 fps (299 mps)

Temperature Limits:

Firing:
- Lower limit ---------- -41°F (40°C)
- Upper limit ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

**Packing ---------- 1 round in fiber container; 2 fiber containers in wooden box

**Packing Box:
- Weight ---------- 76 lb (34.47 kg)
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-3/8 in. (79.53 x 30 x 18.73 cm)
- Cube ---------- 1.6 cu ft (0.05 cu m)

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0006
- Quantity-distance class ---------- 1.1
- Storage compatibility group ---- E
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1315-C704 w/fuze
- DODAC ---------- 1315-C705 w/o fuze
- Drawing number ---------- 5863685

Limitations:

Short rounds may occur when firing with fewer than 10 increments. Minimum charge for firing with a proximity fuze is 10 increments. The Point Detonating Fuze: M739 series with the M329 series cartridges were not qualified during acceptance test. At the present time, the fuze M557 is the only PD fuze authorized for use with the M329 series cartridge.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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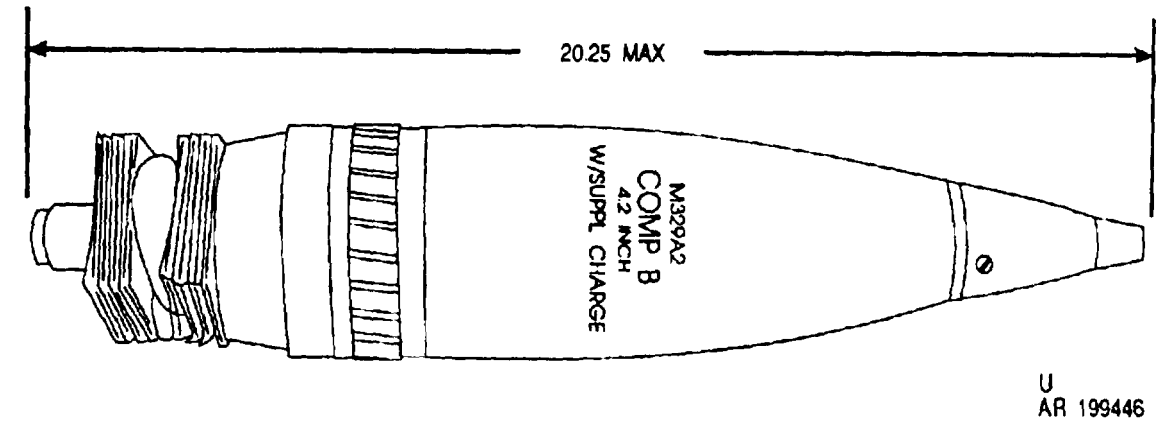
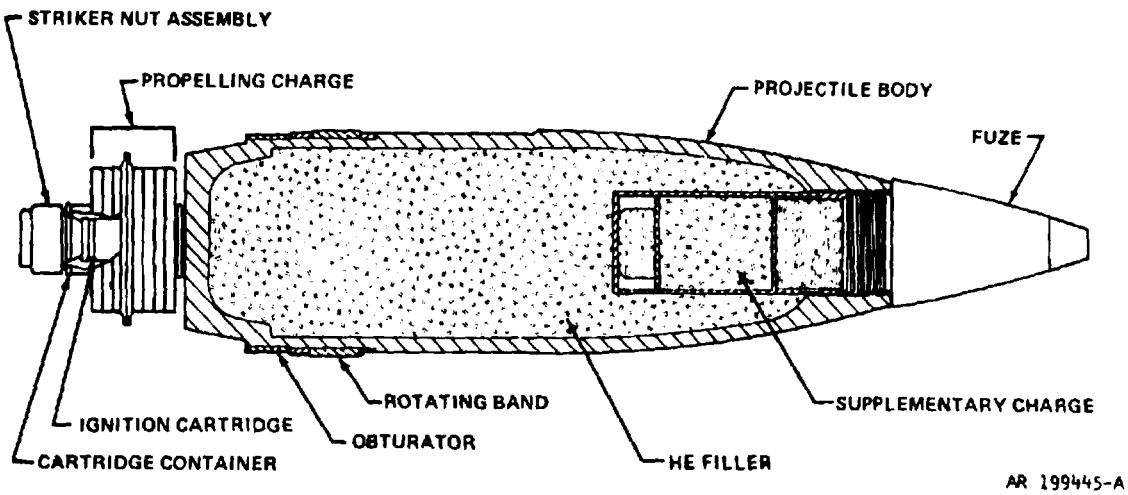
CARTRIDGE, 4.2-INCH: HE, M329A2





Type Classification:

Std LCC-A MSR 01756033.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body a fuze, and a tail assembly. The forged steel body has a pre-engraved rotating band and a neoprene rubber obturating ring near the base, and is designed to accommodate an impact, delay, or proximity fuze. Below the nose is a deep fuze cavity containing a TNT supplementary charge which is removed when using a long-intrusion proximity fuse. The tail assembly consists of a cartridge container and ignition cartridge, a propelling charge, and a striker nut assembly.

Functioning:

The cartridge is positioned so that the pre-engraved rotating band aligns with the rifling grooves in the bore of the tube. When the cartridge is released, it slides down the mortar tube until the striker point in the striker nut assembly strikes the weapon firing pin. The striker point functions the percussion primer in the ignition cartridge. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge.

The gas from the propelling charge exerts pressure on the base of the projectile, expands the obturator, and forces the projectile back up the tube. The pre-engraved rotating band is

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engaged in the rifling and imparts spin to the projectile. The spin stabilizes the projectile in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete Round:	
Type	HE
Weight	22.00 lb (9.98 kg)
Length	20.25 in. (51.44 cm)
Cannon used with	M2, M30
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 5.75 lb (2.61 kg)
Components:	
Ignition cartridge	M2A2*
Propelling charge	M36A2*
Fuzes	PD, M557; MTSQ, M564
Performance (full charge):	
Maximum range	6600 m (21,653.54 ft)
Muzzle velocity	308 mps (1010.50 fps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-65°F (for period not more than 3 days) (-53.89°C)
Upper limit	+160°F (for period not more than 4 hr/day) (71.11°C)

** Packing	1 round in fiber container; 2 containers in wooden box
** Packing Box:	
Weight	63 lb (28.58 kg)
Dimensions	25-3/4 x 11-11/16 x 6-3/8 in. (60.33 x 29.69 x 16.19 cm)
Cube	1.4 cu ft (0.04 cu m)

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C704 w/fuze
DODAC	1315-C697 w/o fuze
Drawing number	9235654

Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F.

The supplementary charge must be removed from the nose cavity before attempting to install a long-intrusion proximity fuze. The Point Detonating Fuze: M739 series with the M329 series cartridges were not qualified during acceptance test. At the present time, the fuze M557 is the only PD fuze authorized for use with the M329 series cartridges.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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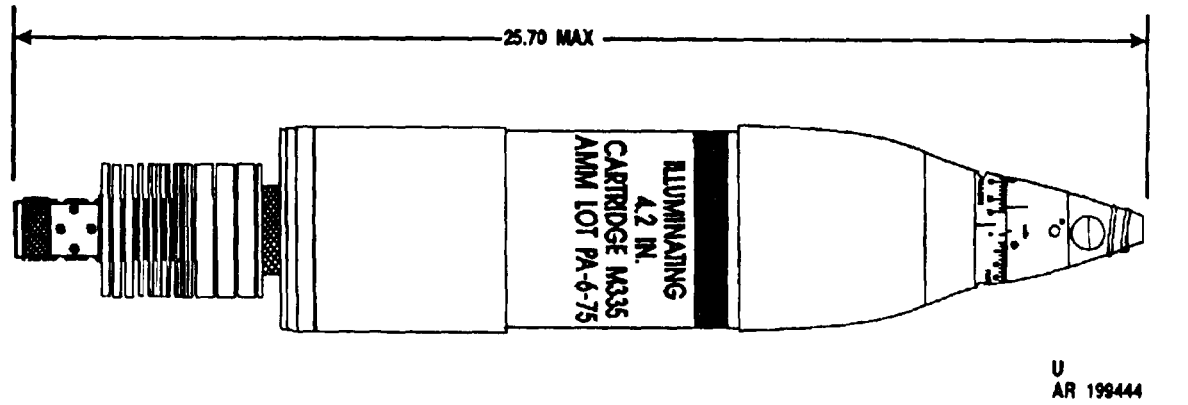
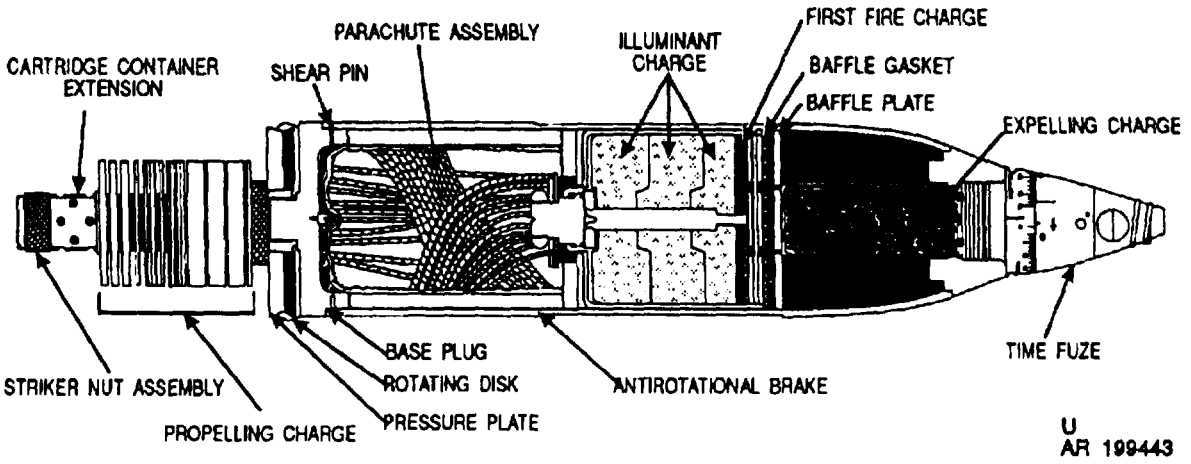
CARTRIDGE, 4.2-INCH: ILLUMINATING, M335A1 AND M335





Type Classification:

M335A1: Std AMCTC 3881 dtd 1965.
M335: Cont AMCTC 9546 dtd 1972

Use:

This cartridge is used for target and battlefield illumination at night and during other periods of low visibility.

Description:

The complete round consists of a projectile body with a detachable base plug, an MTSQ fuze, an illuminant assembly attached to a parachute assembly, and a tail assembly. The steel tube body is designed to accommodate an expelling charge immediately below the fuze, and the base plug is attached with four equally spaced shear pins. The illuminant assembly consists of a first-fire charge and an illuminant charge, contained in a canister fitted with antirotational brakes to reduce canister spin at the time of ejection and prevent twisting of the parachute suspension lines. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. Upon functioning of the MTSQ fuze, the expelling charge is ignited, expelling the illuminant and parachute assemblies from the projectile body and igniting the first-fire charge in the illuminant canister. The first-fire charge ignites the illuminant

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charge, the spring-loaded brakes extend to stop rotation, and the parachute deploys. Burning time is approximate 70 seconds at 500,000 candlepower for the M335A1, and 60 seconds for the M335.

Difference Between Models:

M335A1 and M335 are similar except for ignition cartridges and propelling charges. See separate data sheets or detailed descriptions of ignition cartridges M2A1 and M2, and propelling charges M36A1 and M36.

Tabulated Data:

Complete Round:
- Type ---------- Illuminating
- Weight . . . . . 26.00 lb
- Length . . . . . 25.70 in.
- Cannon used with M2, M30

Projectile:
- Body material . . . . . Steel
- Color ---------- White w/black markings
- Filler and weight ---------- Illuminant, 3.31 lb
- Expelling charge ---------- BP 0.18 lb

Components:

	M335	M335A1
Ignition cartridge	M2*	M2A1*
Propelling charge	M36*	M36A1*
Fuse	MTSQ, M501	MT, M562

Performance (full charge):

	M335	M335A1
Maximum range	5251 yd (4800 m)	5787 yd (5290 m)
Muzzle velocity	952 fps (290 reps)	990 fps (301.7 reps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit . . . . . +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°F) (for period not more than 4 hr/day)

** Packing ---------- 1 round in fiber container; 2 containers in wood box

**Packing Box:
- Weight ---------- 76.0 lb
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-5/8 in.
- Cube ---------- 1.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0171
- Quantity-distance class ---------- 1.2 (08)
- Storage compatibility group ----- G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1315-C706
- Drawing number ---------- 8833724 (M335A1) 8833741 (M335)

References:

TM 9-1015-215-10
TM 9-1300-251-20

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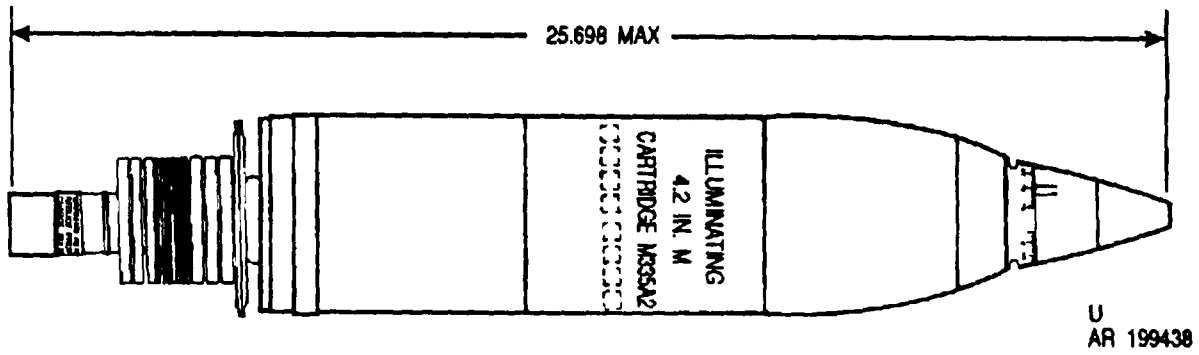
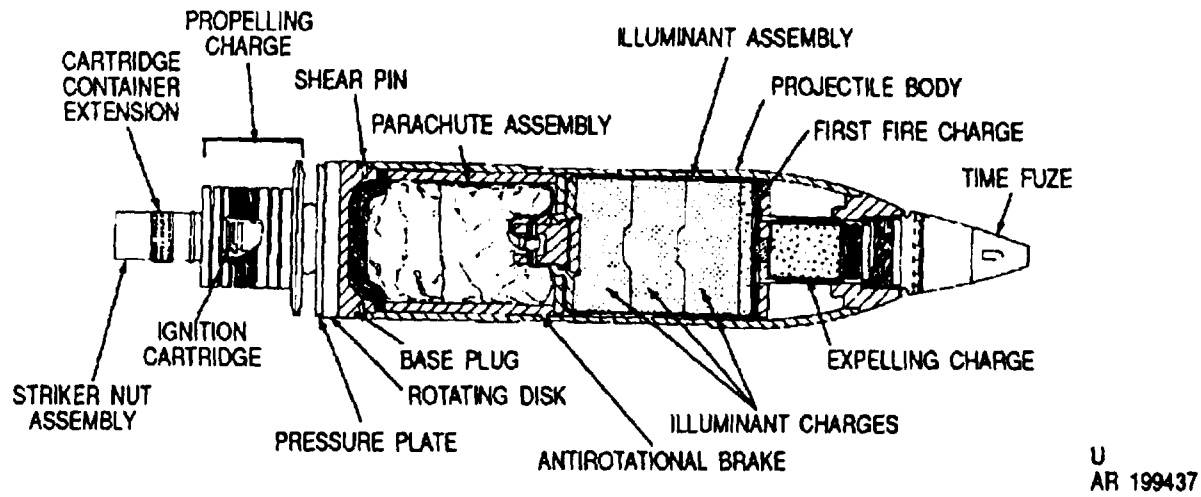
CARTRIDGE, 4.2-INCH: ILLUMINATING: M335A2





Type Classification:

Std AMCTC 3881 dtd 1965

Use:

This cartridge is used for target and battlefield illumination at night and during other periods of low visibility.

Description:

The complete round consists of a projectile body with a detachable base plug, a time fuze, an illuminant assembly attached to a parachute assembly, and a tail assembly. The steel tube body is designed to accommodate an expelling charge immediately below the fuze, and the base plug is attached with four equally spaced shear pins. The illuminant assembly consists of a first-fire charge and an illuminant charge, contained in a canister fitted with antirotational brakes to reduce canister spin at the time of ejection and prevent twisting of the parachute suspension lines. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. Upon functioning of the fuze, the expelling charge is ignited, expelling the illuminant and parachute assemblies through the base of the projectile body and igniting the first fire charge. The first-tire charge ignites the illuminant charge; the spring-loaded brakes extend to stop rotation, and the parachute deploys.

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Burning time is approximately 90 seconds at 850,000 candlepower.

Tabulated Data:

Complete Round:
- Type ---------- Illuminating
- Weight ---------- 26.00 lb
- Length ---------- 25.698 in.
- Cannon used with ---------- M2, M30

Projectile:
- Body material ---------- Steel
- Color ---------- White w/black markings
- Filler and weight ---------- Illuminating, 3.31 lb
- Expelling charge ---------- BP, 0.18 lb

Components:
- Ignition cartridge ---------- M2A2*
- Propelling charge ---------- M36A1*
- Fuze ---------- MT, M565; MTSQ M577

Performance (full charge):
- Maximum range ---------- 6006 yd (5490 m)
- Muzzle velocity ---------- 1001 fps (305.1 rps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for periods not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

**Packing ---------- 1 round in fiber container; 2 containers in wooden box

**Packing Box:
- Weight ---------- 76.0 lb
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-5/8 in.
- Cube ---------- l.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0171
Quantity-distance class ---------- 1.2 (08)
Storage compatibility group ---- G
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC ---------- 1315-C706
Drawing number ---------- 8886595

References:

TM 9-1015-215-10
TM 9-1015-215-20&P
TM 9-1015-215-30
TM 9-1300-251-20
TM 9-1300-251-34

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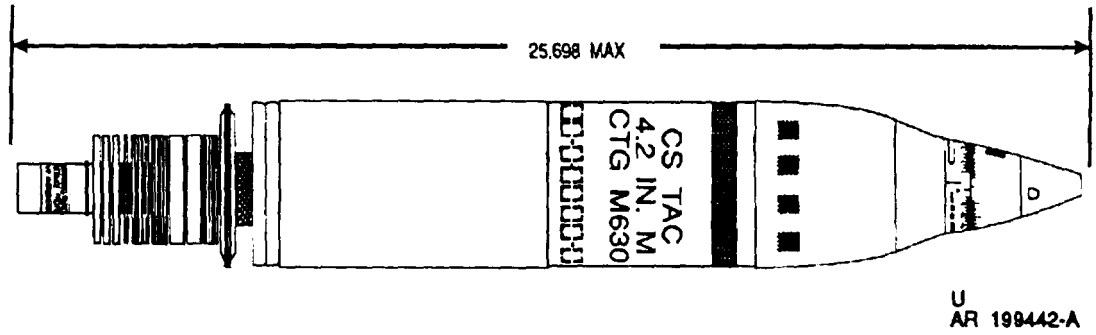
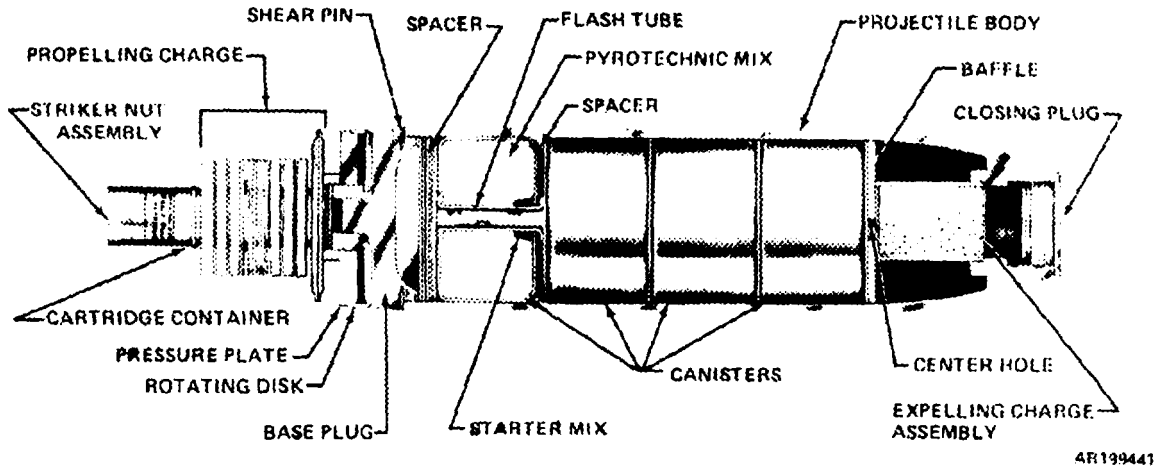
CARTRIDGE, 4.2-INCH: TACTICAL CS, M630





Type Classification:

Std AMCTC 8233 dtd 1971

Use:

This cartridge is used to harass personnel by emitting irritant fumes.

Description:

The complete round consists of a projectile body with a detachable base plug, a time fuze, and a tail assembly. The steel tube body is designed to accommodate an expelling charge immediately below the fuze, and the base plug is attached with four equally spaced shear pins. The body contains four canisters of CS pyrotechnic mix, each with a small charge of starter mix. An aluminum baffle separates the expelling charge from the canisters, and chipboard spacers separate the canisters from each other. The baffle, the spacers, and the canisters have a center hole allowing the flash from the expelling charge to provide ignition. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. Upon functioning of the time fuze, the expelling charge is ignited. Flash from the expelling charge ignites each of the canisters, and the burning canisters are expelled from the projectile body. Average burning time of each canister is 60 seconds, producing a gas which causes extreme burning of the eyes.

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coughing, difficulty in breathing, and chest tightness.

Tabulated Data:

Complete round:	
Type	Tactical CS
Weight	27.07 lb
Length	25.698 in.
Cannon used with	M2, M30
Projectile:	
Body material	Steel
Color	Gray w/red band and red markings
Filler and weight	CS, 4.0 lb
Expelling charge	BP, 0.16 lb
Components:	
Ignition cartridge	M2A2*
Propelling charge	M36A1*
Fuze	MT, M565; MTSQ, M548
Performance(full charge):	
Maximum range	6180 yd (5,650 m)
Muzzle velocity	981 fps (299 mps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°C) (for period not more than 4 hr/day)

**Packing	1 round in fiber container; 2 containers in wooden box
**Packing Box:	
Weight	76.0 lb
Dimensions	31-5/16 x 11-13/16 x 7-318 in.
Cube	l.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0018
Quantity-distance class	1.2 (12)
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITIONFOR CANNON WITH TACTICAL CS PROJECTILES-CLASS B DOT SPECIAL PERMIT NO 5208
DODAC	1315-C710
Drawing number	9220299

Limitations:

Firing with less than 10 increments of propellant can result in short rounds.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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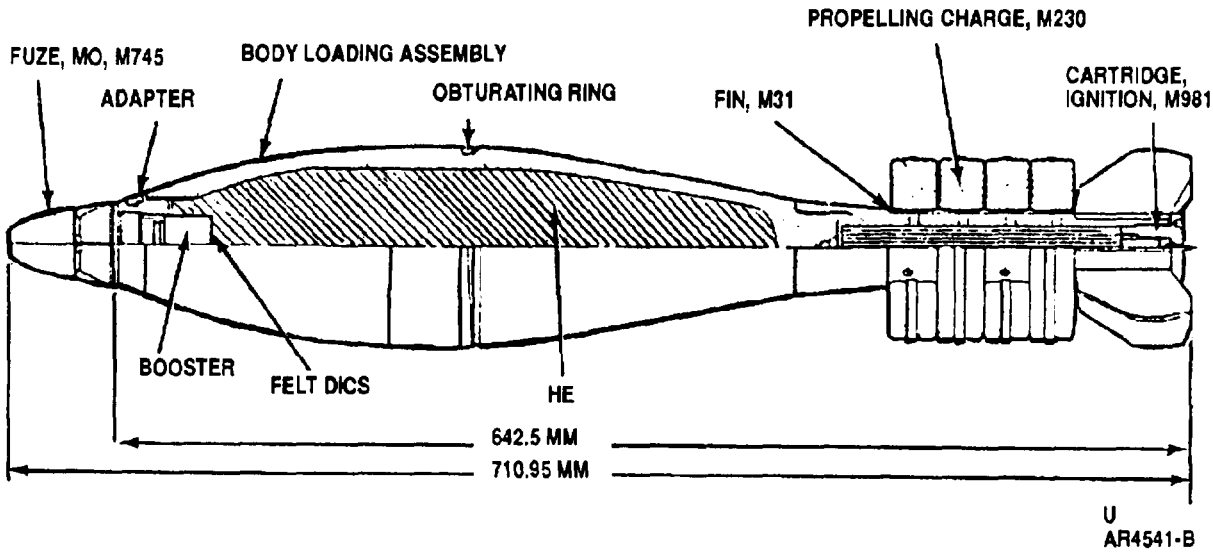
CARTRIDGE, 120 MILLIMETER: HE, M933 WITH FUZE, PD: M745



Type Classification:

TC - Std (May 92).

Use:

This cartridge is a high explosive round developed for use in the M120 and M121 120mm mortar system. It is intended for use against personnel and materiel targets, providing for fragmentation and blast effects.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body made of wrought carbon steel, is loaded with Composition B filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on point-detonating and detonates the projectile.

Tabulated Data:

Complete Round:	
Type	HE
Weight	31.2 lb
Length	27.99 in. (710.95 mm)
Assembly drawing number	12577504
Projectile:	
Body material	Wrought carbon steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 6.59 lb (2.99 kg)
Components:	
Ignition cartridge	M981
Propellant charge	M230
Fin assembly	M31
Faze	PD, M745

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Temperature Limits:

Firing:	
Lower limit	–50°F (-45.6°C)
Upper limit	+145°F (+62.8°C)
Storage:	
Lower limit	-60°F (-51.1°C)
Upper limit	+160°F (+71.1°C)
*Packing	1 round per fiber container w/2 containers per metal container
Fiber container:	
Drawing number	12577551
Metal container:	
Drawing number	12577570

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0005
Quantity-distance class	1.1
Storage compatibility group	F
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C623

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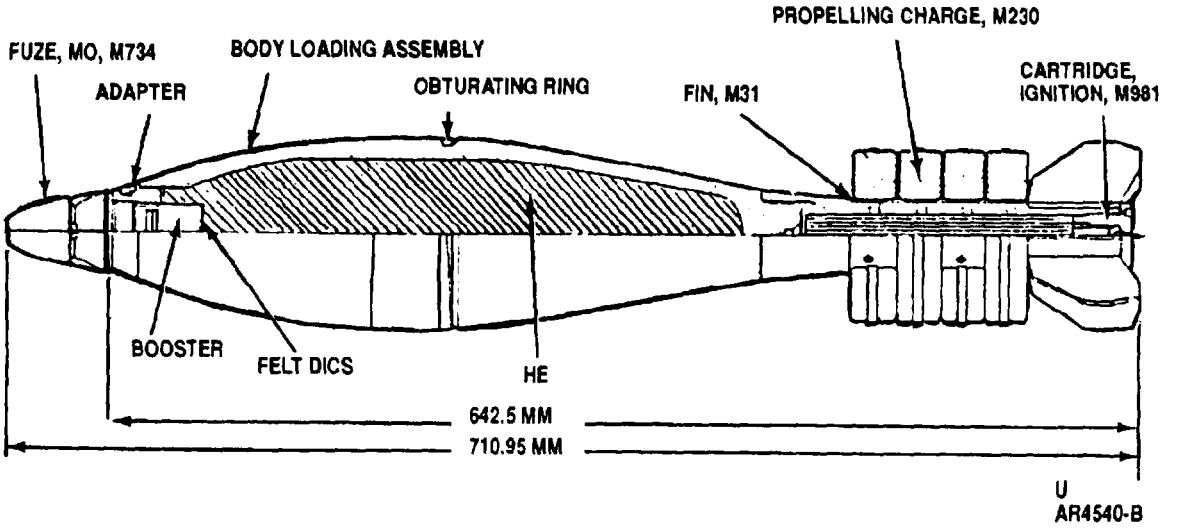
CARTRIDGE, 120 MILLIMETER: HE, M934 WITH FUZE, MULTI-OPTION: M734



Type Classification:

TC - Std (May 92).

Use:

This cartridge is a high explosive round developed for use in the M120 and M121 120mm mortar system. It is intended for use against personnel and materiel targets, providing for fragmentation and blast effects.

Description:

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, and shell body. The shell body made of wrought carbon steel is loaded with Composition B filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the tiring pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on (proximity, near surface, on impact, or delay, depending on the fuze setting) and detonates the projectile.

Tabulated Data:

Complete Round:	
Type	HE
Weight	31.2 lb
Length	27.99 in. (710.95 mm)
Assembly drawing number	12577501
Projectile:	
Body material	Wrought carbon steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 6.59 lb (2.99 kg)
Components:	
Ignition cartridge	M981
Propellant charge	M230
Fin assembly	M31
Faze	Multi-option, M734

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Temperature Limits:

Firing:
Lower limit ---------- -50°F (-45.6°C)
Upper limit ---------- +145°F (+62.8°C)
Storage:
Lower limit ---------- -60°F (-51.1°C)
Upper limit ---------- +160°F (+71.l°C)

*Packing ---------- 1 round per fiber container w/2 fiber containers per metal container
Fiber container:
Drawing number ---------- 12577551
Metal container:
Drawing number ---------- 12577570

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0005
Quantity-distance class ---------- 1.1
Storage compatibility group ----- F
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C379

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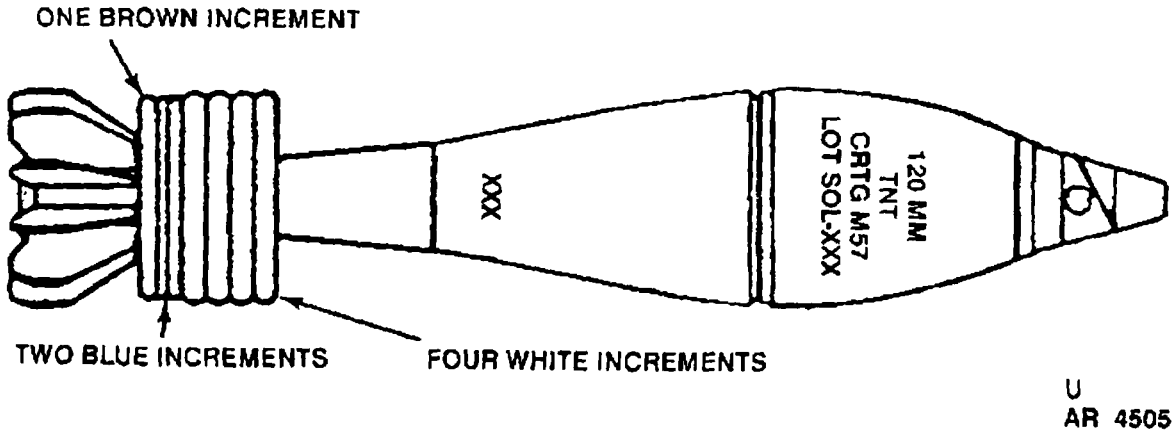
CARTRIDGE, 120 MILLIMETER: HE, M57 WITH FUZE, POINT-DETONATING: M935



Type Classification:

(To be assigned).

Use:

This cartridge is a TNT round developed for use in the M120 120mm mortar system only. It is intended for use against personnel and light materiel targets.

Description:

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, and shell body. The shell body, made of high fragmentation steel, is loaded with TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in one brown increment, two blue increments, and four white increments assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze, PD, M935 functions either superquick, or on delay, 0.05 seconds depending on the fuze.

Tabulated Data:

Complete Round:
- Type ---------- HE
- Weight ---------- 28.65 lb (13 kg)
- Length ---------- 26.18 in. (665 mm)
- Assembly drawing number --- 512-0057-05

Projectile:
- Body material ---------- High fragmentation steel
- Color ---------- Olive drab w/white markings
- Filler and weight ---------- TNT, 4.63 lb (2100 g)

Components:
- Ignition cartridge ---------- N/A
- Fin assembly ---------- N/A
- Faze ---------- PD, M935

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Propellant charge, max. ------- 1 brown increment, 2 blue increments, 4 white increments

Temperature Limits:

Firing:
Lower limit ---------- –28°F (-33.3°C)
Upper limit ---------- +145°F (+62.8°C)

Storage:
Lower limit ---------- -50°F (-45.6°C)
Upper limit ---------- +145°F (+62.8°C)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

Ammo container:
Drawing number ---------- 512-3007-01
Box:
Drawing number ---------- 512-5015-00

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0321
Quantity-distance class ---------- (08) 1.2
Storage compatibility group ----- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C788

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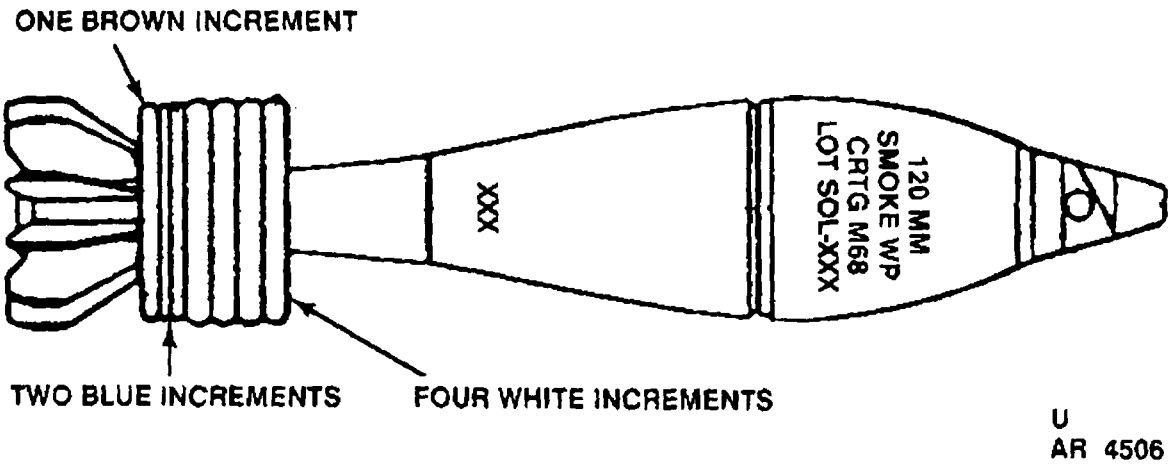
CARTRIDGE, 120 MILLIMETER: SMOKE (WP), M68 WITH FUZE, POINT-DETONATING: M935



Type Classification:

(To be assigned).

Use:

This cartridge is used against personnel and materiel as incendiary device and to produce a screening. This cartridge is for use in the M120 120mm mortar system only.

Description:

The complete round consists of a fuze, three types of propellant increment, fin assembly, ignition cartridges and shell body. The shell body, made of steel, is loaded with white phosphorus (WP) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in one brown increment, two blue increments and four white increments and is assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze, point-detonating (PD), M935 functions either superquick, or on delay 0.05 seconds.

Tabulated Data:

Complete Round:	
Type	Smoke
Weight	28.65 lb (13 kg)
Length	26.18 in. (665 mm)
Assembly drawing number	512-0068-03
Projectile:	
Body material	Steel
Color	Light green w/black markings
Filler and weight	WP, 4.47 lb (2030 g)
Components:	
Ignition cartridge	N/A
Fin assemble	N/A
Faze	PD, M935
Propellant charge, max	1 brown increment, 2 blue increments, 4 white increments

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Temperature Limits:

Firing:	
Lower limit	-28°F (-33.3°C)
Upper limit	+145°F (+62.8°C)
Storage:	
Lower limit	-50°F (-45.6°C)
Upper limit	+145°F (+62.8°C)
*Packing	1 round per fiber container; 2 containers per wooden box
Ammo container:	
Drawing number	512-3007-01
Box:	
Drawing number	512-5015-00

*NOTE: See DOD Consolidate Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(04)1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITIONFOR CANNON WITH SMOKE PROJECTILE
DODAC	1315-C789

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases so that if WP melts, it will resolidify with void space in normal position in the nose of the cartridge. Erratic performance may occur if voids exist inside of WP filler.

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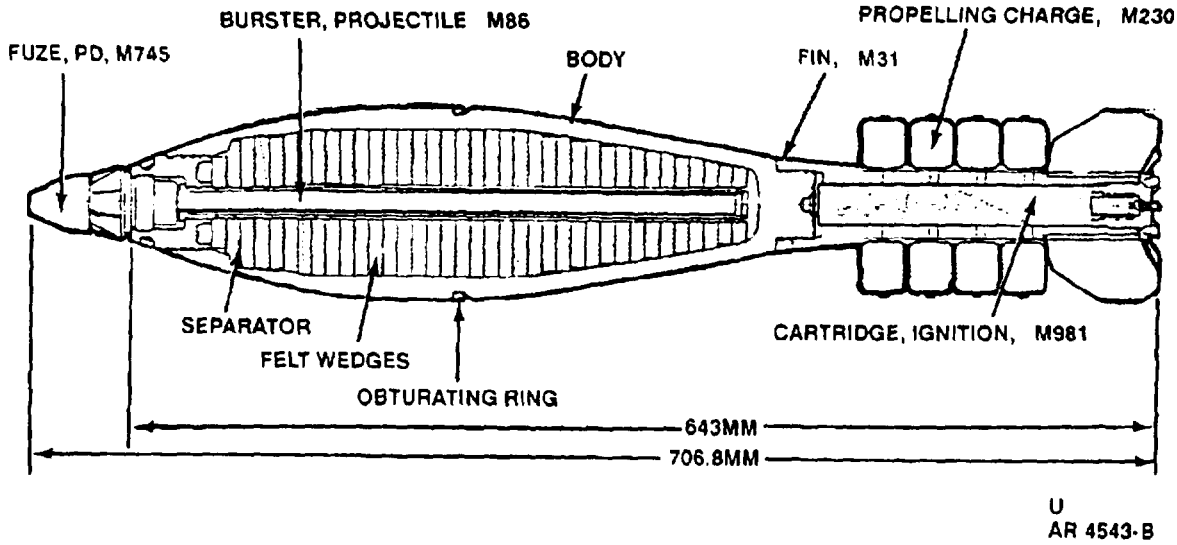
CARTRIDGE, 120 MILLIMETER: SMOKE (W), M929 WITH FUZE, POINT-DETONATING: M745



Type Classification:

TC - LRP (8 May 92).

Use:

This cartridge is a smoke, white phosphorous (WP) round developed for use in the M120 and M121 120mm mortar system. It is intended for use as an incendiary device and to produce a screen.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body, made of wrought carbon steel, is loaded with WP filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on point-detonating and the booster ignites the burster charge in the center part of the projectile body. The burster charge fragments the projectile body and disperses 144 felt wedges impregnated with WP, which burns immediately on contact with air. The wedges burn for approxi-

twice as effective as the 4.2-inch, M328A1.

Tabulated Data:

Complete Round:	
Type	Smoke (WP)
Weight	31.2 lb
Length	27.85 in. (706.8 mm)
Assembly drawing number	12577502
Projectile:	
Body material	Wrought carbon steel
Color	Light green w/yellow band and light red markings
Filler and weight	WP felt wedges, 5.28 lb, (2400 g)

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Components:
- Ignition cartridge ---------- M981
- Propellant charge ---------- M230
- Fin assembly ---------- M31
- Fuze ---------- Point-detonating, M745
- Burster ---------- M86

Temperature Limits:

Firing:
- Lower limit ---------- -50°F (-45.6°C)
- Upper limit ---------- +145°F (+62.8°C)

Storage:
- Lower limit ---------- -60°F (-51.1°C)
- Upper limit ---------- +160°F (-71.1°C)

*Packing ---------- 1 round per fiber container; 2 fiber containers per metal container
- Fiber container:
  - Drawing number ---------- 12577551
- Metal container:
  - Drawing number ---------- 12577570

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0245
Quantity-distance class ---------- (08) 1.2
Storage compatibility group ----- H
DOT shipping class ---------- A
DOT designation ---------- AMMUNITIONFOR CANNON WITH SMOKE PROJECTILE
DODAC ---------- 1315-C624

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases so that if WP melts, it will resolidify with void space in normal position in the nose of the cartridge. Erratic performance may occur if voids exist inside of WP filler.

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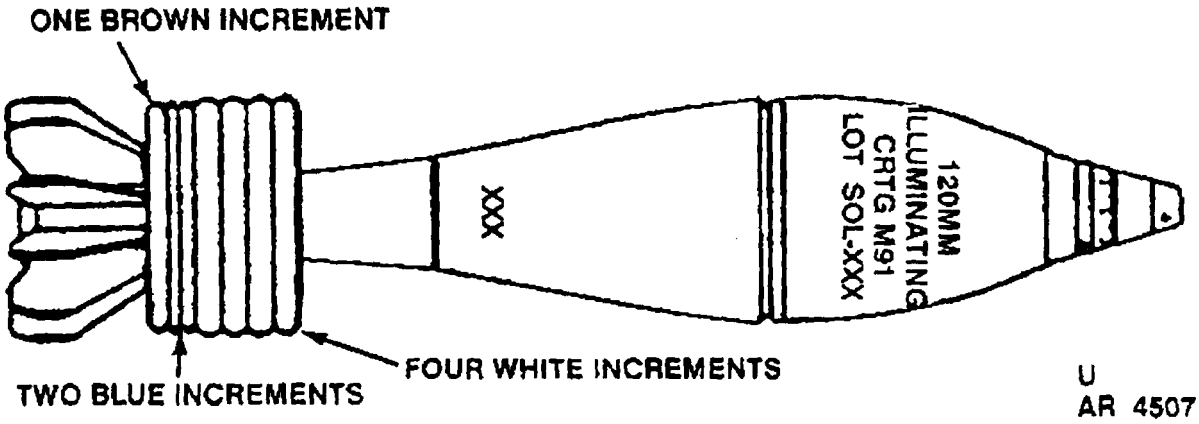
CARTRIDGE, 120 MILLIMETER: ILLUMINATING, M91 WITH FUZE, MECHANICAL TIME SUPERQUICK: M776



Type Classification:

(To be assigned).

Use:

This cartridge is used for illuminating a desired point or area. This cartridge is for &e in the M120 120mm mortar system only.

Description:

The complete round consists of a steel body and tail cone assembly an illuminant candle and parachute assembly a time fuze with a built-in expelling charge, a fin assembly propellant charge, and an ignition cartridge with percussion primer. The nose of the thin walled steel tubing body is fitted with a steel adapter and internally threaded to accept the fin assembly, and is attached to the body tube with eight equally spaced shear pins. The illuminant assembly consisting of a first-fire charge and an illuminant charge, is contained in an aluminum case and attached to the parachute with a fiberglass suspension line.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions at a height of burst according to its time setting expelling and igniting the candle which is deployed on a parachute and provides illumination for 50 seconds.

Tabulated Data:

Complete Round:

Type	Illuminating
Weight	27 lb (12.250 kg)
Length	26.18 in. (665 mm)
Assembly drawing number	512-0068-03

Projectile:

Body material	Steel
Color	White w/black markings
Filler and weight	Illuminant, 2.65 lb, (1200 g)
Expelling charge	BP 0.03 lb (15 g)

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Components:
- Ignition cartridge---------- N/A
- Fin Assembly ---------- N/A
- Fuze---------- MTSQ, M776
- Propellant charge max- - - - - - - - - 1 brown increment, 2 blue increments, 4 white increments

Candlepower - 1,000,000 candle power/sec

Burning time- 50 sec

Temperature Limits:

Firing
- Lower limit -28°F (-33.3°C)
- Upper Limit - - - - - - - - - - - - - - - - - - - +145°F (+62.8°C)

Storage:
- Lower limit -50°F (-45.6°C)
- Upper limit - +145F (+62.8°C)

*Packing - 1 round per fiber container; 2 containers per wooden box

Ammo container:
- Drawing number - - - - - - - - - - - - - - - - 512-3007-01

Box:
- Drawing number - - - - - - - - - - - - - - - 512-5015-00

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and storage Data:

UNO serial number - - - - - - - - - - - - - - - 0254
Quantity distance class _ _ _ _ _ _ (02) 1.3
Storage compatibility group - - - - - - G
DOT shipping cams - - - - - - - - - - - - - - - A
DOT designation- - - - - - - - - - - - - - - - AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILE
DODAC - 1315-C790

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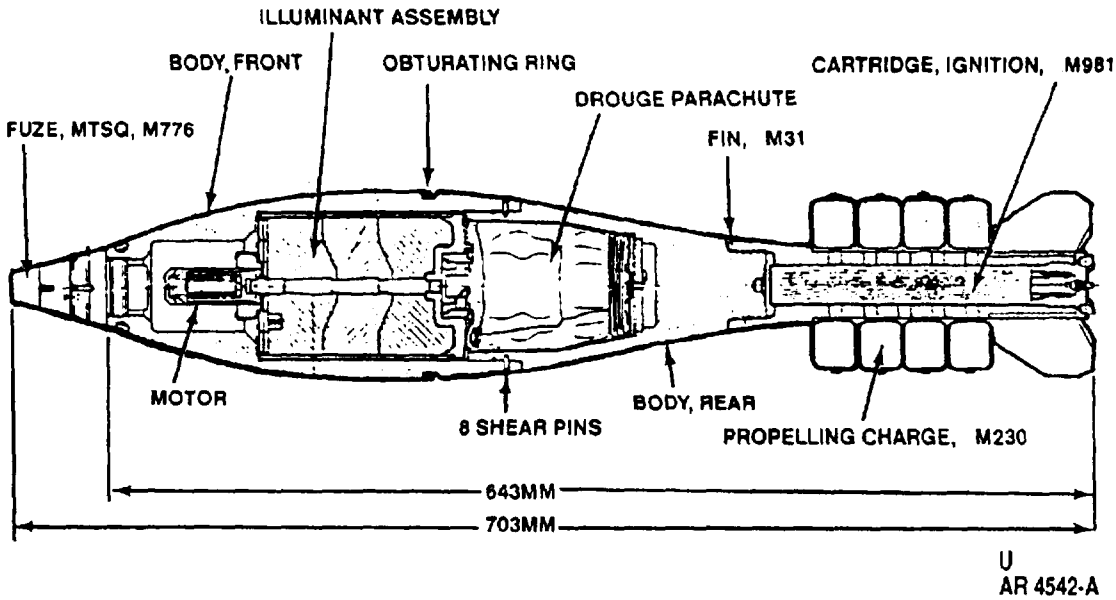
CARTRIDGE, 120 MILLIMETER: ILLUMINATING, M930 WITH FUZE, MECHANICAL TIME SUPERQUICK: M776



Type Classification:

TC - LRP (27 Nov 91).

Use:

This cartridge is an illuminant round developed for use in the M120 and M121 120mm mortar system. It is intended for use in illuminating a desired point or area.

Description:

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, body tube, tube cone assembly illuminant candle, and parachute assembly. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions depending on the fuze setting and ignites the expulsion charge which ignites the first-fire candle. This ignites the rocket motor, then eight shear pins are sheared. The rocket motor pulls candle assembly and parachute away from tail cone, extending the pull cord. Parachute assembly opens and deploys. The candle assembly provides illumination for 50 seconds.

Tabulated Data:

Complete Round:	
Type	Illuminating
Weight	31.2 lb
Length	27.85 in. (703 mm)
Assembly drawing number	12577503
Projectile:	
Body material	Wrought carbon steel
Color	White w/black markings
Filler and weight	Illuminant, 2.65 lb, (1200 g)

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Candlepower ---------- 1,000,000 candlepower/sec

Components:
- Ignition cartridge ---------- M981
- Propellant charge ---------- M230
- Fin assembly ---------- M31
- Fuze ---------- MTSQ, M776

Temperature Limits:

Firing
- Lower limit ---------- -50°F (-45.6°C)
- Upper limit ---------- +145°F (+62.8°C)

Storage:
- Lower limit ---------- -60°F (-51.1°C)
- Upper limit ---------- +160°F (-71.1°C)

*Packing ---------- 1 round per fiber container; 2 containers per metal container

Fiber container:
- Drawing number ---------- 12577551

Metal container:
- Drawing number ---------- 12577570

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0171
Quantity distance class ---------- (08) 1.2
Storage compatibility group ----- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILE
DODAC ---------- 1315-C625

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CHAPTER 5

AMMUNITION FOR RECOILLESS RIFLES

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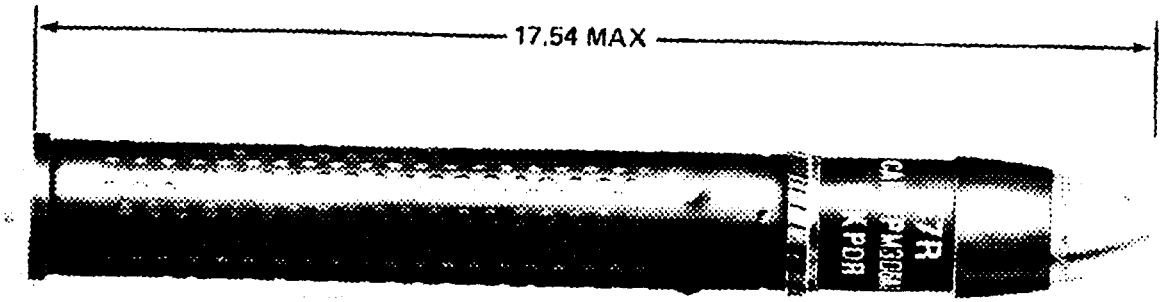
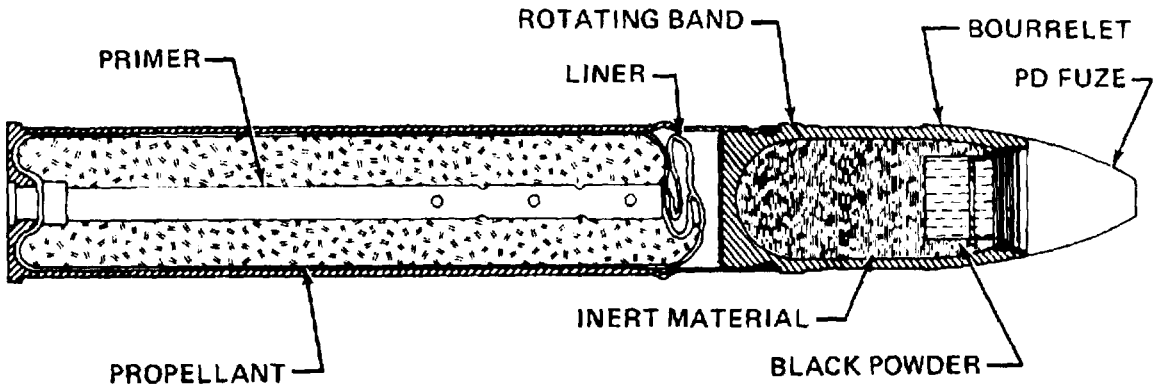
CARTRIDGE 57-MILLIMETER: TP M306A1



AR199769



AR199768

Type Classification:

Cont OTCM 37119 dtd 1959.

Used:

This cartridge is used in 57mm recoilless rifles for target practice.

Description:

The cartridge consists of a perforated metal cartridge case, containing a plastic liner, which is crimped to a steel projectile. The cartridge case liner is loosely filled with propellant and the cartridge case is equipped with a percussion primer. The primer ignition tube extends through the length of the propelling charge. The projectile resembles the HE round M306A1 with the same shape and pre-engraved rotating band; however, instead of high explosive filler, the target practice round contains only a small black powder marking charge. The projectile is equipped with a PD fuze. This target practice round has the same ballistics as the HE round.

Functioning:

The black powder flash from the primer ignites the propelling charge when the primer is struck by the firing pin of the weapon. The burning propellant generates gases to propel the projectile through the barrel to the target. Recoil is eliminated because some gas pressure escapes through the perforated cartridge case, and then through the apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile for stability in flight. Fuze detonation ignites the black powder charge in the projectile to produce flash and smoke for marking the impact point.

Tabulated Data:

Complete round:

Type	TP
Weight	5.4 lb
Length	17.54 in.
Cannon used with	M18A1, M18

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Projectile:

Body material	Forged steel
Color	Blue or black with white markings
Filler and weight	Inert material, 6.46 oz, Black powder 1.1 oz

Components:

Cartridge case	M30A1B1
Propelling charge	M10
Primer	M60A1
Fuze	PD, M503A1 or M503

Performance:

Maximum range	4508 m
Muzzle velocity	1200 fps

TemperatureLimits:

Firing:

Lower limit	40°F
Upper limit	+125°F

Storage:

Lower limit	80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	1 round in fiber container; 4 containers in wooden box

*Packing Box:

Weight	39.0 lb
Dimensions	22-1/8 x 7-5/8 x 8-1/2 in.
Cube	0.82 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1310-B588
Drawing number	751252

Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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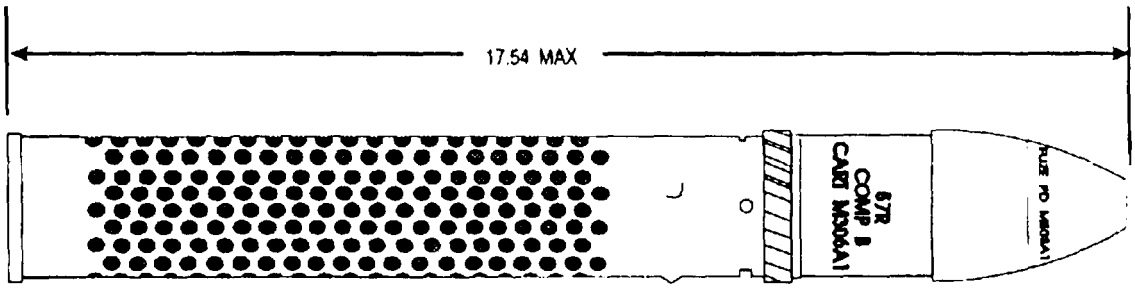
CARTRIDGE, 57-MILLIMETER: HE, M306A1 AND M306



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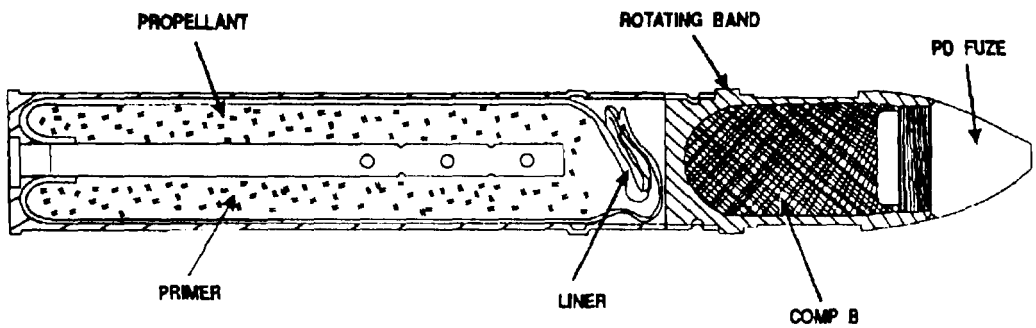
AR 199777



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AR 199776

Type Classification:

M306A1 C & T OTCM 37119 dtd 1959.
M306 C & T OTCM 37119 dtd 1959.

Use:

High Explosive Cartridge M306A1 is designed for blast, fragmentation and mining. The cartridge is used with Rifles M18A1 and M18.

Description:

HE Cartridge M306A1 consists of a perforated cartridge case containing a plastic liner and percussion primer. The propelling charge is loosely loaded into the liner. The cartridge case is crimped to a high-explosive projectile with a square base, a short internally threaded ogive and integral, pre-engraved rotating band. The projectile contains an explosive charge of Composition B or TNT. Projectiles are fuzed with point-detonating (PD) Fuze M503A2, M503A1 or M503 which function on direct impact or graze. There is a bourrelet on the rear of the ogive and another immediately in front of the rotating band. The cartridge is spin-stabilized in flight.

Functioning:

The primer ignites the propellant when struck by the weapon firing pin, and the burning propellant generates gases to propel the projectile through the barrel. Recoil is eliminated because the design of the cartridge case permits controlled escape of some gas pressure through apertures in the rifle breech-block. The rotating band engages the rifling in the barrel to spin the projectile for stability in flight. The point-detonating fuze functions either on direct impact or graze. When the fuze functions, the firing pin strikes a detonator to initiate the explosive train in the fuze, and subsequently detonates the explosive charge producing blast and fragmentation.

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Difference Between Models:

Cartridge HE, M306 is similar to Cartridge M306A1, differing principally in the design of the crimping groove.

Tabulated Data:

Complete round:	
Type	HE
Weight	5.46 lb
Length	17.54 in.
Cannon used with	M18, M18A1
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	M306A1: Comp B, 0.55 lb. M306 TNT, 0.55 lb
Components:	
Cartridge case	M30A1B1 or M30A1B2
Propelling charge	M10
Primer	M60, M60A1 or M46
Tracer	N/A
Fuze	PD, M503 series
Performance:	
Maximum range	4,508 m
Muzzle velocity	1,200 fps

Temperature Limits:

Firing:	
Lower limit	-65°F
Upper limit	+160°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)

*Packing	1 round in fiber container; 6 fiber container in wooden box
*Packing Box:	
Weight	51 lb
Dimensions	21-1/2 x 10-7/16 x 8-3/16 in.
Cube	1.1 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data inducting NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity -distance class	(08) 1.2
Storage compatibility	È
DOT shipping class	A
DOT designation	AMMUNI - TION FOR CANNON WITH EX- PLOSIVE PROJEC- TILE
DODAC	1310-B586
Drawing number	9215030

Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

Reference=

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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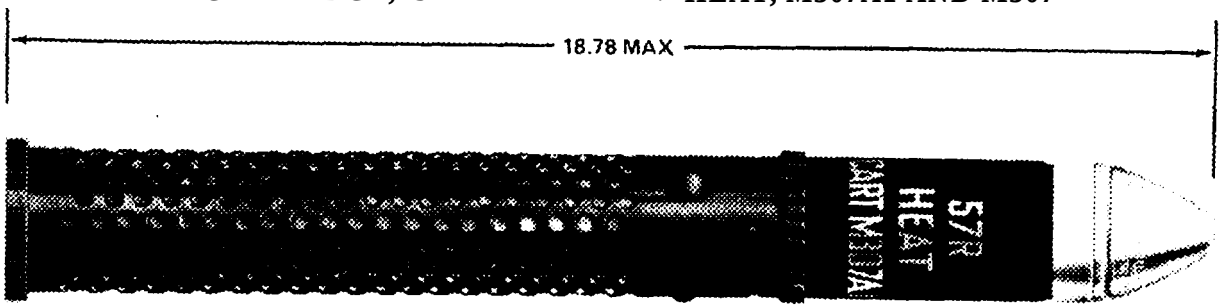
CARTRIDGE, 57-MILLIMETER: HEAT, M307A1 AND M307



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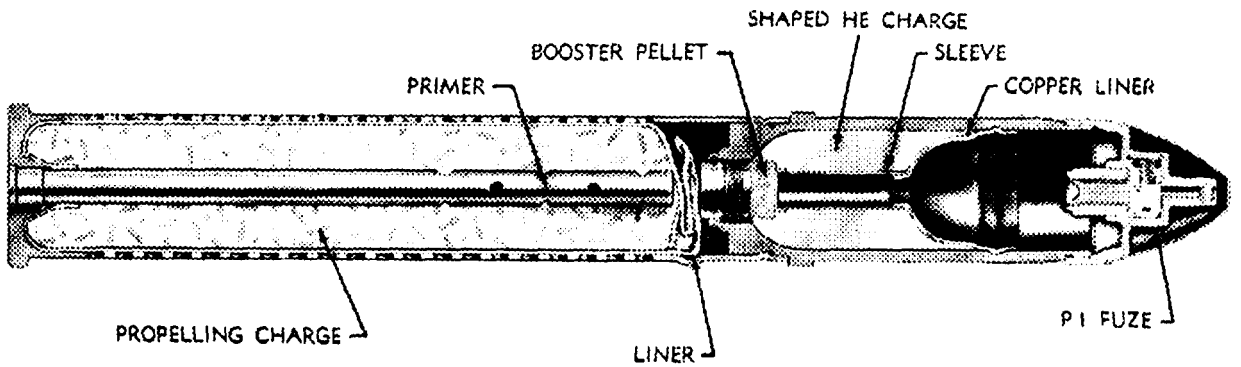

AR 199774-A

Type Classification:

Cont OTCM 37119 dtd 1959.

Use:

This cartridge is employed against armored targets and used with 57mm Rifles M18 and M18A1.

Description:

HEAT Cartridge M307A1 includes a perforated metal cartridge case containing a plastic liner and a percussion primer and is crimped to the projectile just behind the pre-engraved rotating band of the projectile. The projectile forward cap is threaded to receive a point detonating fuze. A hemispherical copper liner crimped to the interior of the projectile forms a shaped charge to the rear and space forward to provide the standoff necessary for penetration. A steel sleeve brazed to the neck of the copper liner provides a passage from the fuze to a booster pellet in the base of the projectile. The booster pellet extends into the high explosive charge.

Functioning:

The primer ignites the propellant when struck by the weapon firing pin, and the burning propellant generates gases to propel the projectile through the barrel. Recoil is eliminated because the design of the cartridge case permits controlled release of some gas pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile. The fuze functions upon impact and fires through the steel sleeve to the booster pellet. Detonation of the explosive charge collapses the copper liner and creates a focussed, high velocity shock wave containing a jet of metal particles that penetrates the interior of the target.

Difference Between Models:

M307 uses a paper-lined Cartridge Case M30 and Percussion Primer M46.

Tabulated Data:

Complete round:

Type	HEAT
Weight	5.43 lb
Length	18.78 in.
Cannon used with	M18, M18A1

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Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow marking
Filler and weight	Comp B or 50-50 Pentolite-0.40 lb
Booster weight and type	Integral (tetryl)
Components:	
Cartridge case	M30A1 or M30A1B1
Propelling charge	M10
Primer	M60 or M60A1
Fuze	PI, M90, or M90A1
Performance:	
Maximum range	4,443 m
Muzzle velocity	l,200 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	1 round per fiber container; 6 fiber containers in wooden box.
*Packing Box:	
Weight	51.51 lb
Dimensions	23 x 10-7/16 x 8-11/32 in.
Cube	1.2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility	E
DOT shipping class	A
DOT designa	AMMUNITIONFOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B587
Drawing number	75-1-215

Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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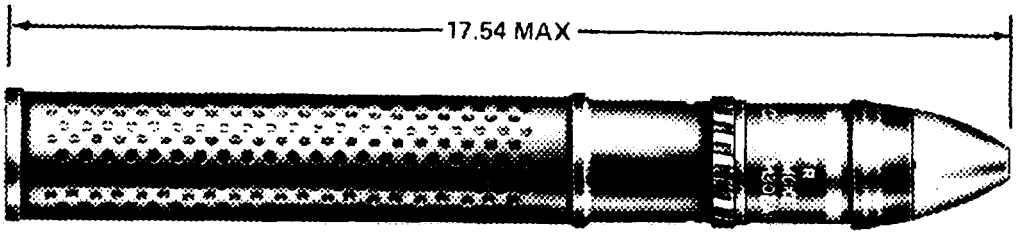
CARTRIDGE, 57-MILLIMETER: SMOKE, WP, M308A1 AND M308



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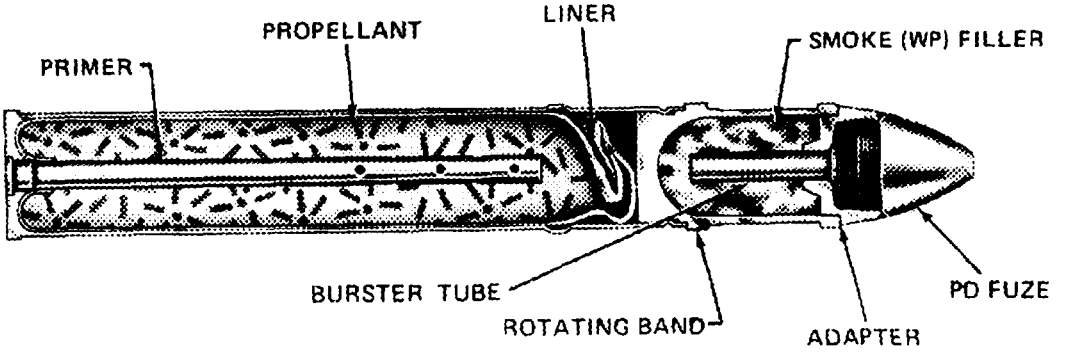

AR199772

Type Classification:

Cont OTCM 37119 dtd 1959.

Use:

This cartridge is used in 57mm recoilless Rifles M18A1 and M18 and is intended primarily for screening and spotting.

Description:

WP Cartridge M308A1 includes a perforated cartridge case containing a plastic liner and a percussion primer. The propelling charge is loosely loaded into the plastic liner. The cartridge case is crimped to the projectile just behind the pre-engraved rotating band. A steel adapter forms the front end of the projectile. The burster is press-fitted into the adapter, and the fuze is threaded into the adapter. The projectile is filled with white phosphorous.

Functioning:

The primer ignites the propellant when struck by the weapon firing pin, and the burning propellant generates gases to propel the projectile through the barrel. Recoil is eliminated because the design of the cartridge case permits the controlled release of some gas pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile for stability in flight. On impact, the fuze functions to detonate the burster tube. The burster ruptures the projectile and disperses the white phosphorous filler. White phosphorous ignites spontaneously on contact with air, emitting a dense white smoke.

Difference Between Models:

M308 uses a paper-lined cartridge case and Percussion Primer M46.

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Tabulated Data:

Complete round:	
Type	Smoke WP
Weight	5.43 lb
Length	17.54 in.
Cannon used with	M18A1, M18
Projectile:	
Body material	Forged steel
Color:	
Old	Gray with yellow band and yellow markings
New	Light green with black markings
Filler and weight	WP, 0.37 lb
Burster	M21, 0.19 oz tetryl
Components:	
Cartridge case:	
M308A1	M30A1B1
M308	M30
Propelling charge	M10
Primer:	
M308A1	M60A1
M308	M46
Fuze	PD, M503 series
Performance:	
Maximum range	4143 m
Muzzle velocity	l,200 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)

*Packing:	1 round in fiber container; 6 containers in wooden box
*Packing Box:	
Weight	51.0 lb
Dimensions	21-9/16 x 10-7/16 x 8-3/16 in.
Cube	l.l cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0245
Quantity-distance	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1310-B590
Drawing number	9215427

Limitations:

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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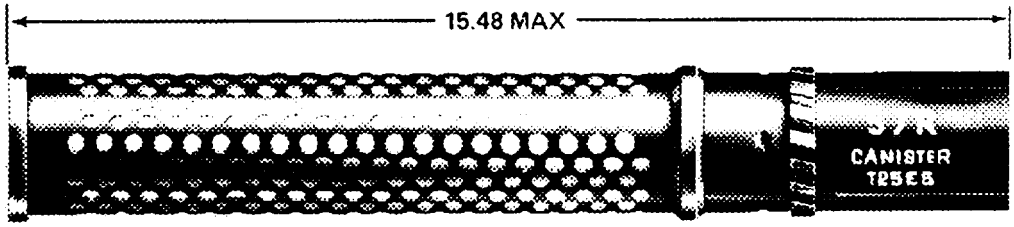
CARTRIDGE, 57-MILLIMETER CANISTER, T25E5



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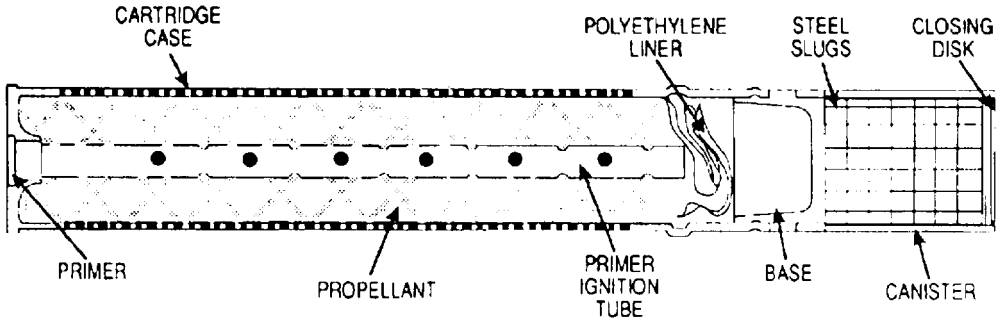

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AR 199770

Type Classification:

LP AMCTC 7875 dtd 1970.

Use:

This canister cartridge is fired from 57mm recoilless rifles for antipersonnel effect at close range.

Description:

The cartridge consists of a perforated metal cartridge case crimped to a cylindrical canister projectile. The cartridge case contains a polyethylene liner which is loosely filled with propellant and is equipped with a percussion primer. The primer ignition tube extends through the length of the propelling charge. The canister case is loaded with 154 or 176 stacked, cylindrical steel slugs. The thin steel case has four equally spaced slits extending from the nose to within 1/4 inch of a pre-engraved rotating band near the base. The canister is closed at the front by crimping and welding to a steel disk, and at the rear by a heavy steel base.

Functioning:

When the primer is struck by the firing pin of the weapon, flame from the primer black power ignites the propellant. The burning propellant generates gases to propel the canister through the barrel, and spin is provided by the rotating band engaging the barrel rifling. Recoil is eliminated because the design of the cartridge case permits the controlled release of some gas pressure through apertures in the rifle breech-block. Breakup of this projectile is initiated by fracture at the body grooves under forces encountered in firing. The payload of steel slugs is dispersed by centrifugal action after breakup of the canister at the rifle muzzle. The slugs are thrown forward in a conical pattern.

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Tabulated Data:

Complete round:	
Type	Antipersonnel
Weight	5.43 lb
Length	15.48 in.
Cannon used with	M18A1, M18
Projectile:	
Body material	Steel
Color:	
Old	Black w/white markings
New	Olive drab w/white markings
Filler and weight	Steel slugs, 1.8 lb
Components:	
Cartridge case	M30A1B1 or M30A1B2
Propelling charge	M10
Primer	M60A1
Performance:	
Maximum range	160 m
Muzzle velocity	l,200 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)

*Packing:	1 round in fiber container; 6 containers in wooden box
*Packing Box:	
Weight	49.0 lb
Dimensions	19-5/8 x 10-1/2 x 8-13/32 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILE
DODAC	1310-B585
Drawing number	9215708

Limitations:

Canister may not be fired overhead of friendly troops.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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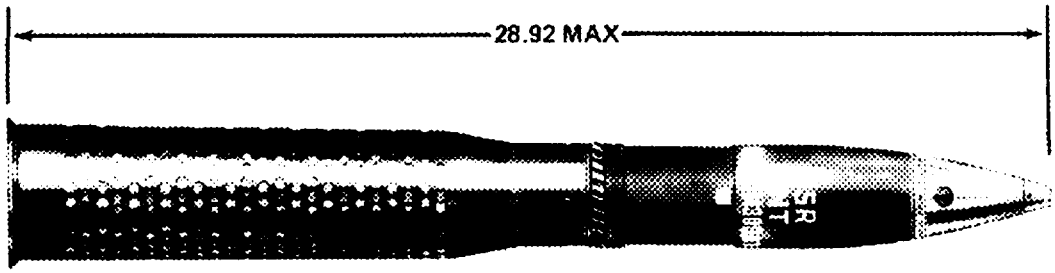
CARTRIDGE, 75-MILLIMETER: HE, M309A1 AND M309



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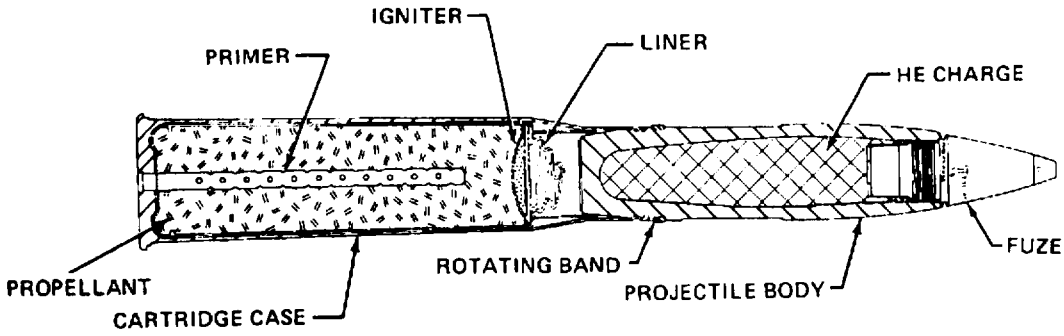

AR199766

Type Classification:

Cont OTCM 37119 dtd 1958.

Use:

This cartridge is fired from 75mm recoilless rifles and is used for blast, fragmentation, and mining effects.

Description:

The cartridge consists of a perforated metal cartridge case crimped to a hollow steel projectile. The cartridge case contains a plastic liner which is filled loosely with propellant. An igniter charge is positioned on top of the propellant. A percussion primer is fitted in the base, with an igniter tube extending through the propelling charge. The projectile is fitted with either a point detonating or mechanical time, superquick fuze in the nose, and is filled with TNT. The rotating band near the base is preengraved to match the bore rifling of the weapon. A bourrelet at the rear of the ogive and another forward of the rotating band are provided as bearing surfaces for the projectile in the rifle bore.

Functioning:

When the weapon firing pin strikes the primer, flame from the primer black powder ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the rifle barrel and to the target. Recoil is eliminated because some gas pressure escapes through the perforated cartridge case, and is controlled by apertures in the rifle breech-block. The rotating band engages the bore rifling to spin the projectile for stability in flight. On impact, fuze functioning detonates the high explosive, producing blast and fragmentation.

Difference Between Models:

M309 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

Tabulated Data:

Complete round:

Type	HE
Weight with fuze	22.37 lb
Length with fuze	28.92 in.
Cannon used with	M20

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Projectile:	
Body material	Forged steel
color	Olive drab w(yellow markings
Filler and weight	TNT, 1.49 lb
Components:	
Cartridge case:	
M309A1	M31A1
M309	M31
Propelling charge	M10
Primer	M47B2 or M47
Fuze	PD, M51 Series or M557; MTSQ, M520A1
Performance:	
Maximum range	6364 m
Muzzle velocity	990 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)

*Packing	1 cartridge in fiber container; 2 containers in wooden box
*Packing Box:	
Weight	73.0 lb
Dimensions	34-1/4 x 11-5/16 x 7-9/32 in.
Cube	1.64 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08)1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C051
Drawing number	75-1-221

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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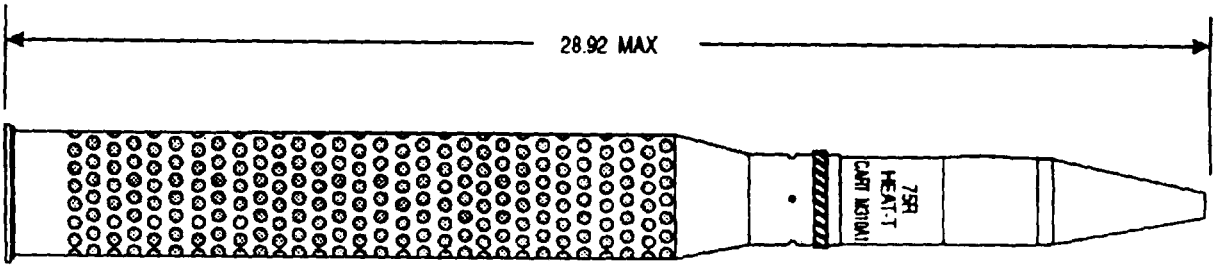
CARTRIDGE, 75-MILLIMETER: HEAT-T M310A1 AND M310



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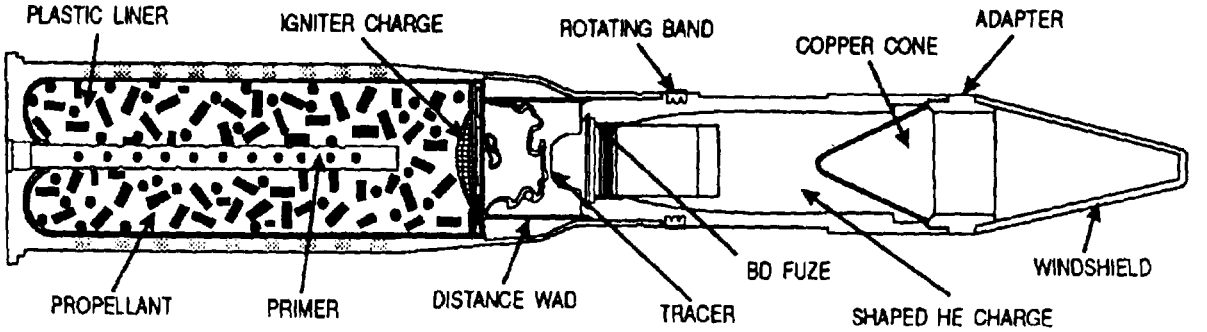

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AR 199762

Type Classification:

Use:

This cartridge is fired in 75mm recoilless rifles against armored targets.

Description:

This cartridge consists of a perforated metal cartridge case, containing a plastic liner, crimped to a high explosive antitank projectile. The liner is loosely filled with propellant, with an igniter charge on top, and all retained by a distance wad. A percussion primer is fitted in the base with an igniter tube extending through the propelling charge. The hollow steel projectile of M31OA1 is filled with Composition B around an internal copper cone to shape the charge. The nose of the shell is covered by a windshield threaded to a steel nose adapter. The space within the cone, adapter, and windshield provide the appropriate stand-off distance for the shaped charge. The base of the projectile carries a base-detonating fuze. A rotating band near the base is pre-engraved to match the weapon rifling.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the weapon. The burning propellant generates rapidely expanding gases to propel the proiectle through the barrel. Recoil is eliminated because some of the gas pressure escapes through the perforated cartridge case and release is controlled through apertures in the breech-block of the rifle. The propelling charge also ignites the tracer in the BD fuze to provide visibility of the trajectory. The rotating band engages the barrel rifling to spin the projectile for stability in flight. On impact, the fuze functions to detonate the shaped charge and collapse the internal cone. This action generates a focussed high velocity shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target.

Difference Between Models:

M310 has a paper-lined cartridge case and the projectile is 50/50 pentolite loaded. There is no igniter charge in the propelling charge.

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Tabulated Data:

Complete round:	
Type	HEAT-T
Weight	21.06 lb
Length	28.92 in.
Cannon used with	M20
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight:	
M310A1	Comp B, 1.0 lb
M310	50/50 pentolite, 0.89 lb
Components:	
Cartridge case:	
M310A1	M31A1
M310	M31
Propelling charge	M10
Primer	M47B2 or M47
Tracer	M5
Fuze	BD, M91A1
Performance:	
Maximum range	6575 m
Muzzle velocity	1000 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing:	1 cartridge in fiber container; 2 containers in wooden box
*Packing Box:	
Weight	73.0 lb
Dimensions	34-1/4 x 11-5/16 x 7-9/32 in.
Cube	1.64 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C052
Drawing number	75-1-222

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20

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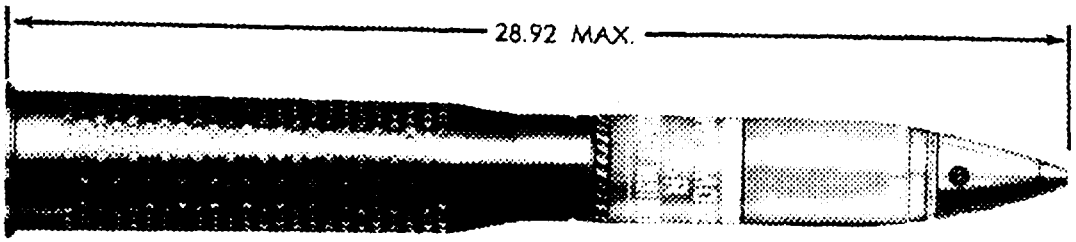
CARTRIDGE, 75-MILLIMETER: SMOKE, WP, M311A1 and M311



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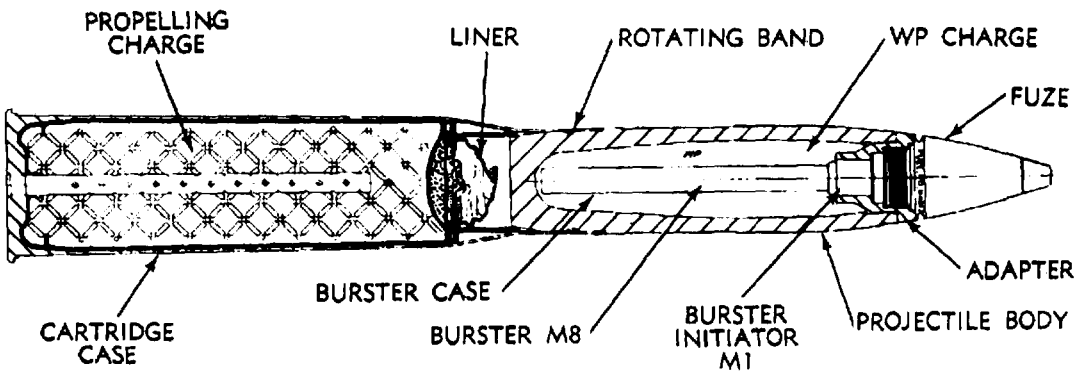

AR 199764

Type Classification:

Cont OTCM 37119 dtd 1959.

Use:

This cartridge is used in 75mm recoilless rifles for screening and spotting.

Description:

The cartridge consists of a perforated metal cartridge case containing a plastic liner which is crimped to a hollow steel projectile. The liner is filled with loose propellant and an igniter charge is positioned on top of the propellant. A percussion primer is assembled in the base of the cartridge case. The igniter tube of the primer extends through the propelling charge. The projectile is filled with white phosphorous. The projectile has a pre-engraved rotating band near the base. Two bourrelets, one behind the ogive and one just ahead of the rotating band, provide bearing surfaces for the projectile in the weapon barrel. An adapter at the nose accommodates the burster tube and is threaded to accept the point detonating fuze. The burster tube holds a tetryl charge and is press-fitted into the adapter to seal in the WP projectile contents.

Functioning:

The primer ignites the propelling charge when struck by the weapon firing pin. Rapidly expanding gases from the burning propellant provide the force to propel the projectile through the barrel and to the target. Recoil is eliminated because the cartridge case design permits controlled escape of some gas pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile. On impact, the fuze detonates the burster charge to rupture the projectile and disperse the white phosphorous. WP ignites spontaneously on contact with air and produces a dense white smoke.

Difference Between Models:

M311 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

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Tabulated Data:

Complete round:	
Type	Smoke (WP)
Weight	23.20 lb
Length	28.92 in.
Cannon used with	M20
Projectile:	
Body material	Forged steel
Color	Gray w/yellow band and yellow markings
Filler and weight	WP, 1.35 lb
Burster casing	M6: initiator Ml and burster M8, 1.01 oz. tetryl
Components:	
Cartridge case	
M311A1	M31A1
M311	M31
Propelling charge	M10
Primer	M47B2 or M47
Fuze	PD, M48A3, M57 (MOD)
Performance:	
Maximum range	6364 m
Muzzle velocity	990 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)

* Packing	1 cartridge in fiber container; 2 containers in wooden box
*Packing Box:	
Weight	73.0 lb
Dimensions	34-1/4 x 11-15/16 x 7-9/32 in.
Cube	1.64 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C056
Drawing number	75-1-225

Limitations:

Rounds should be stored and transported on their bases when temperatures exceed 111.4°F, the melting point of WP, to avoid cavities in the filler.

References:

B 700-20
MC-P 700-3-3
M 9-1300-251-20

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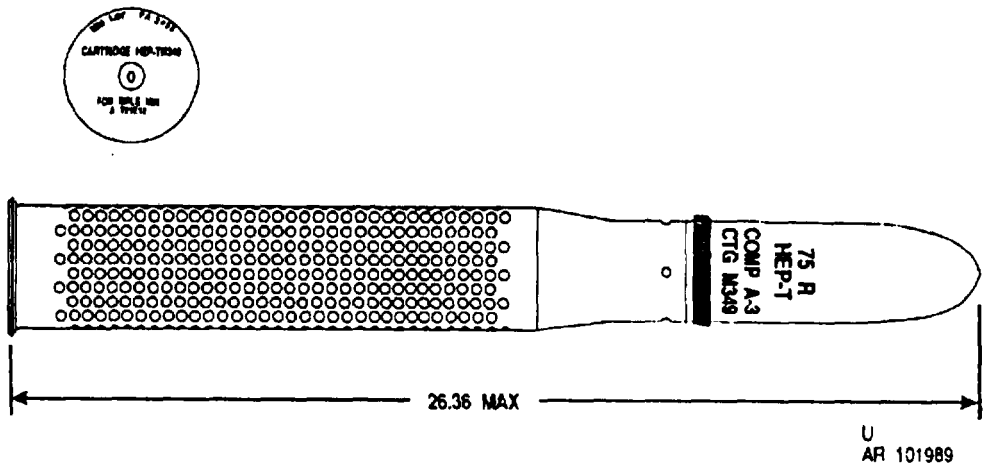
CARTRIDGE, 75-MILLIMETER: HEP-T, M349



Type Classification:

OBS MSR 11756003.

Use:

This cartridge is designed for use against armored targets light materiel and personnel.

Description:

The complete round consists of a thin steel projectile with an internally threaded base, assembled to a perforated steel cartridge case. The projectile contains a filler of 2.55 pounds of Composition A3 and employs a base-detonating fuze. The cartridge case contains a propelling charge of single-perforated propellant, and an igniter charge, both of which are sealed in a double rayon/plastic liner, a percussion primer is positioned in the base of the cartridge case.

Functioning:

When the weapon is fired, the firing pin strikes the primer which ignites the propellant. The propellant creates gases that force the projectile out of the tube and propel it to the target. The tracer is also ignited and burns during the early stages of flight. On impact, the functioning of the fuze detonates the explosive.

Tabulated Data:

Complete round:	
Type	HEP-T
Weight	16.52 lb
Length	26.36 in.
Cannon used with	M20 + T21E12
Projectile:	
Explosive filler	2.55 lb Comp A 3
Body materiel	Steel
Color	Olive drab w/yellow markings and black bands
Cartridge case	M31A1
Primer	M47 or M47B2
Propellant:	
Type	M10
Weight	3.36 lb
Tracer	Integral w/fuze
Fuze BD	M91A1

Ballistics:

Maximum range	7,180 yd; 6,570 m
Muzzle velocity	1400 fps

Temperature Limits:

Firing:	
Lower limits	-40°F
Upper limits	+125°F
Storage:	
Lower limits	-80°F (for periods of not more than 3 days)
Upper limits	+160°F (for periods of not more than 4 hr/day)

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*Packing ---------- 1 cartridge per fiber container; 2 containers per wooden box

[b] Packing box:
Weight filled ---------- 95 lb
Dimensions OD ---------- 32 x 11-5/16 x 7-9/32 in.
Cube ---------- 1.52 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C053
Drawing number	75-1-32

References:

AMC-P 700-3-3

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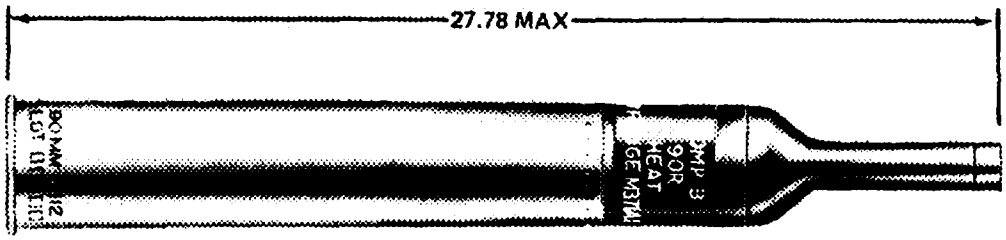
CARTRIDGE, 90-MILLIMETER: HEAT M371A1



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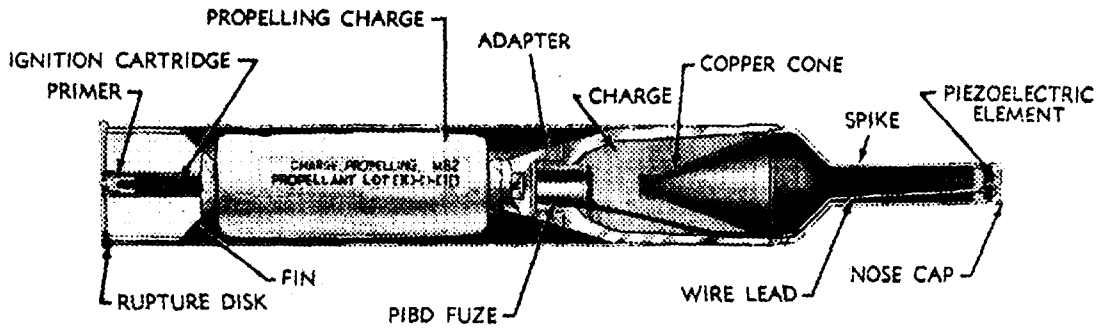

Type Classification:

Std AMCTC 4265 dtd 1966.

Use:

This cartridge is used in 90mm recoilless rifles and is intended primarily for defeat of armor. There is also some limited effectiveness against fixed targets and personnel through blast and fragmentation.

Description:

The cartridge consists of an aluminum cartridge case and a steel projectile containing a shaped charge of high explosive. A percussion primer with a black powder ignition cartridge is assembled to the base of the round. A rupture disk is held in place in the base of the cartridge case by the primer. The propelling charge is contained in a bag installed around the fin assembly which contains the primer ignition cartridge. The projectile has a stand-off spike, containing a piezoelectric element and a paper insulating cup, which is threaded to the body. An internal copper cone shapes the charge. The point initiating, base detonating fuze is contained in an adapter threaded to the base. The adapter is threaded to the fin assembly. The fins provide in-flight stability.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the projectile out of the barrel and to the required velocity. Recoil is minimized by blowout of the rupture disk and controlled pressure relief through apertures in the breech-block. The rojectile is stabilized in flight by the tail fins. On impact, crushing of the piezoelectric unit triggers the fuze. The standoff spike provides the optimum distance from the target surface for explosion of the shaped charge. The detonation collapses the copper cone and creates a focussed, high velocity shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior.

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Tabulated Data:

Complete round:	
Type	HEAT
Weight with fuze	9.25 lb
Length	27.78 in.
Cannon used with	M67
Projectile:	
Body material	Steel and aluminum
Color:	
Old mfg.	Olive drab w/yellow markings
New mfg.	Black w/yellow markings
Filler and weight	Comp B, 1.72 lb
Components:	
Cartridge case	M112
Propelling charge	M82
Primer:	
M371A1	M92A1
M371	M78
Fuze	PIBD, M530A1, M530
Performance:	
Maximum range	400 m
Muzzle velocity	213 mps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
* Packing	1 round in fiber container; 1 container in wooden box
*Packing Box:	
Weight	42 lb
Dimensions	32-15/16 x 9-7/8 x 6-3/8 in.
Cube	1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C282
Drawing number	8863468

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-223-12
TM 9-1300-251-20

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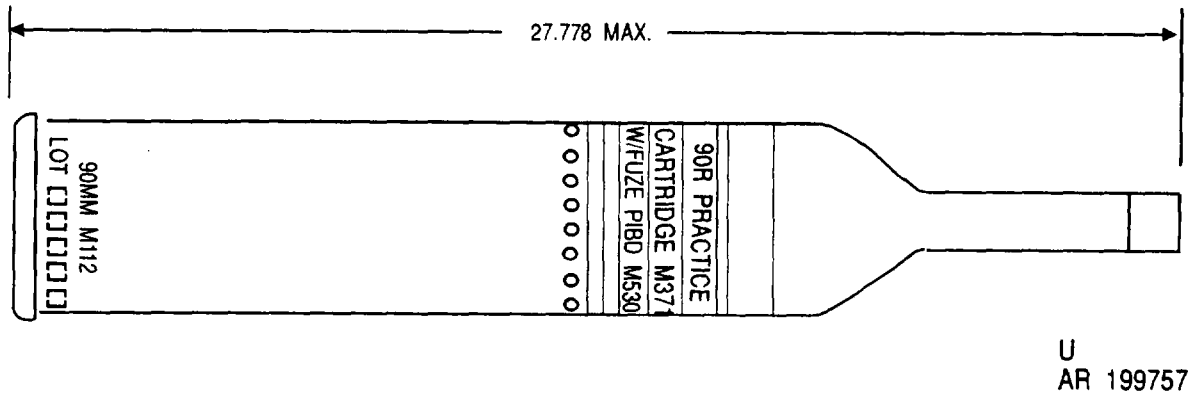
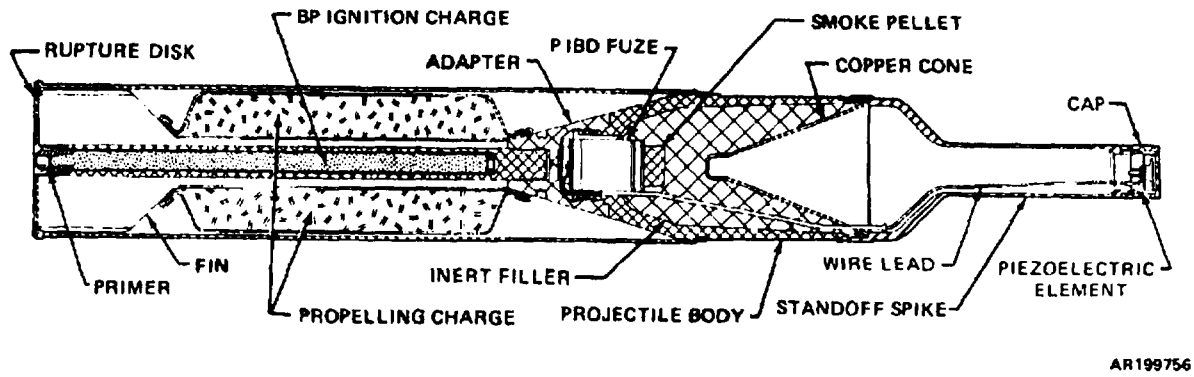
CARTRIDGE, 90-MILLIMETER: PRACTICE, M371





Type Classification:

Std OTCM 37136 dtd 1959.

Use:

This cartridge is used to train personnel armed with the 90mm recoilless rifles in handling and use of HEAT rounds.

Description:

The cartridge resembles 90mm HEAT round M371A1 and has similar ballistic characteristics, except that the high explosive filler is replaced with inert material of the same weight. A standoff spike with piezoelectric element in the nose cap is threaded to the nose of the projectile, and an adapter and fin are threaded to the base. The point initiating, base detonating fuze is housed in the adapter and a smoke pellet is installed immediately ahead of the fuze. A copper cone in the projectile shapes the inert filler to maintain a ballistic match with the service round. The bagged propellant in the cartridge case surrounds the fin. The base of the cartridge case holds a percussion primer and a rupture disk. The black powder ignition charge of the primer is contained within the fin.

Functioning:

When the firing pin of the weapon strikes the primer, it ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile out of the barrel and to the target. The fin stabilizes the projectile in flight. On impact, distortion of the piezoelectric element induces an electric current to function the PIBD fuze and ignite the smoke pellet for marking.

Tabulated Data:

Complete round:	
Type	Practice
Weight	9.25 lb
Length	27.778 in.
Cannon used with	M67
Projectile:	
Body material	Aluminum alloy
Color	Blue or black w/white markings

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Filler and weight	Inert E, 1.79 lb Pellet Box 2B
Components:	
Cartridge case	M112
Propelling charge	XM82
Primer	XM92
Fuze	PIBD, M530
Performance:	
Effective range	400 m
Muzzle velocity	213 mps

TemperatureLimits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not more than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)
* Packing	1 round in fiber container; 2 containers in wooden box

*Packing Box:	
Weight	47 lb
Dimensions	32-15/16 x 9-7/8 x 6-3/8 in.
Cube	1.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C283
Drawing number	8865243

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-223-12
TM 9-1300-251-20

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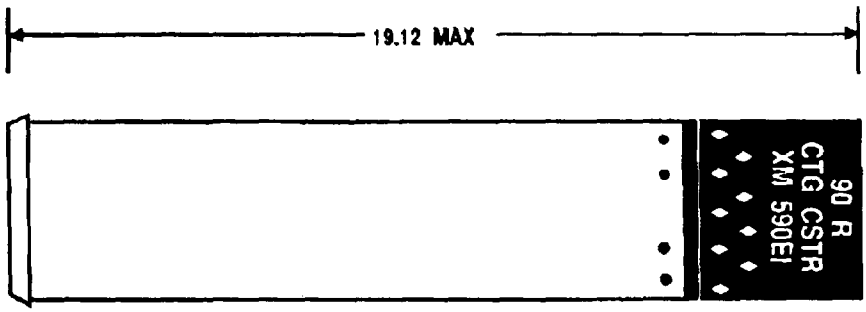
CARTRIDGE, 90-MILLIMETER CANISTER, ANTIPERSONNEL, M590 (XM590E1)



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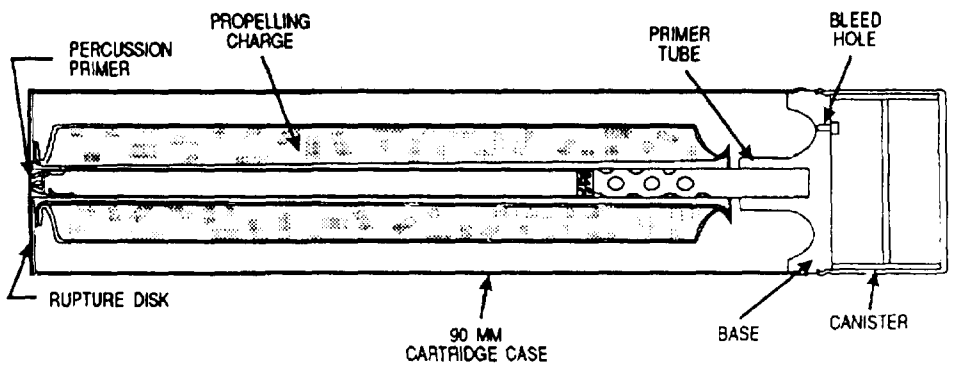

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AR 199760

Type Classification:

Std AMCTC 8601 dtd 1971.

Use:

This cartridge is used in 90mm recoilless rifles for close-in defense against massed attack by infantry, or for attacking enemy troops concealed by vegetation.

Description:

The cartridge consists of an aluminum cartridge case crimped to an aluminum canister filled with steel flechettes. The cartridge case is unperforated and the base contains a rupture disk. A percussion primer is assembled through the rupture disk into a perforated flash tube that is threaded into the base of the canister. The cartridge case is filled with double-base propellant in a silk bag arranged around the primer tube. The canister projectile has a blunt forward end and a heavy aluminum base with three bleed holes to the cartridge case. The sides are scored to facilitate splitting when the round is fired.

Functioning:

The primer ignites the propellant when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the canister out of the barrel. Recoil is minimized by blowout of the rupture disk in the base and controlled pressure release through apertures in the breech-block. At the same time, the bleed holes in the canister base permit gas pressure to build up inside the canister. When the projectile leaves the muzzle, the pressure ruptures the canister along the score marks to release the flechettes.

Tabulated Data:

Complete round:	
Type	Canister antipersonnel
Weight	6.79 lb
Length	19.12 in
Cannon used with	M67
Projectile:	
Body material	Aluminum
Color	Olive drab w/white markings and white diamonds

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Filler and weight	2400 flechettes; 2.5 lb
Components:	
Cartridge case	M112
Propelling charge	M178
Primer	M92A1
Performance:	
Effective range	200 m
Muzzle velocity	1200 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more that 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
* Packing	1 round in fiber container; 6 containers in wirebound box
*Packing Box:	
Weight	58 lb
Dimensions	22-5/8 x 13-1/2 x 10-1/16 in.
Cube	1.8 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT desigtion	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C410
Drawing number	9214567

Limitations:

Canister may not be fired overhead of friendly troops.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-223-12
TM 9-1300-251-20

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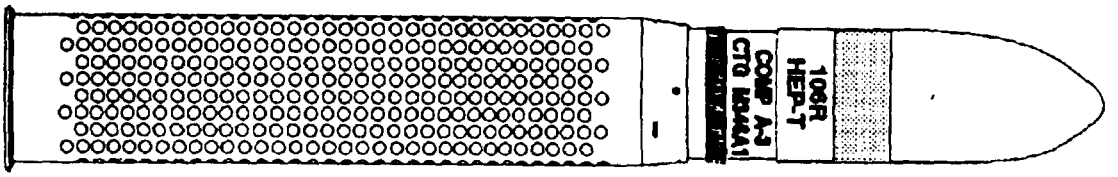
CARTRIDGE, 106-MILLIMETER: HEP-T, M346A1



U
AR 101983

Type Classification:

Std OTCM 37119, dtd 1959.

Use:

This cartridge is intended for use against armored targets and is also effective against personnel and light materiel.

Description:

The projectile is a thin-walled steel cylinder with a short ogive and flat base. There are two indexing buttons, spaced 180° apart on the forward bourrelet. A pre-engraved rotating band encircles the projectile just forward of the base. The base is fitted with a base-detonating fuze with integral tracer. The projectile body is loaded with 7.72 pounds of Composition A3. The perforated steel cartridge case, crimped to the projectile contains a propelling charge in a rayon and plastic liner. A percussion primer is press fitted to the base.

Functioning:

When the weapon is fired, the firing pin strikes the primer and a flash from the primer ignites the tracer (which burns during the early stages of flight) and creates gases which force the projectile out of the gun tube and propel it to the target. On impact, the functioning of the fuze detonates the explosive.

Tabulated Data:

Complete round:

Type	HEP-T
Weight	37.37 lb
Length	38.1 in.
Cannon used with	M40A1 and M40A1C

Projectile:

Explosive filler	7.72 lb Comp A3
Body materiel	Steel
Color	Olive Drab w/yellow markings and black band
Cartridge case	M94B1

Propellant:

Type	M26
Weight	7.86 lb
Primer	M57
Fuze BD	M91A2

Ballistics:

Maximum range	7,515 yd 6,870 m
Muzzle velocity	1,635 fps

Temperature Limits:

Firing:

Lower limit	-40°F
Upper limit	+ 125°F

Storage:

Lower limit	-80°F (for period of not more than 3 days)
Upper limit	+160°F (for period of not more than 4 hr/day)

*Packing	1 round per fiber container; 2 containers per wooden box

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*Packing Box:
Weight ---------- 95 lb
Dimensions ---------- 27-5/8 x 3-7/16 x 4-13/16 in.
Cube ---------- 1.52 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0005
Quantity-distance class ---------- 1.1
Storage compatibility group ----- F
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C651
Drawing number ---------- 8837335

References:

AMC-P 700-3-3

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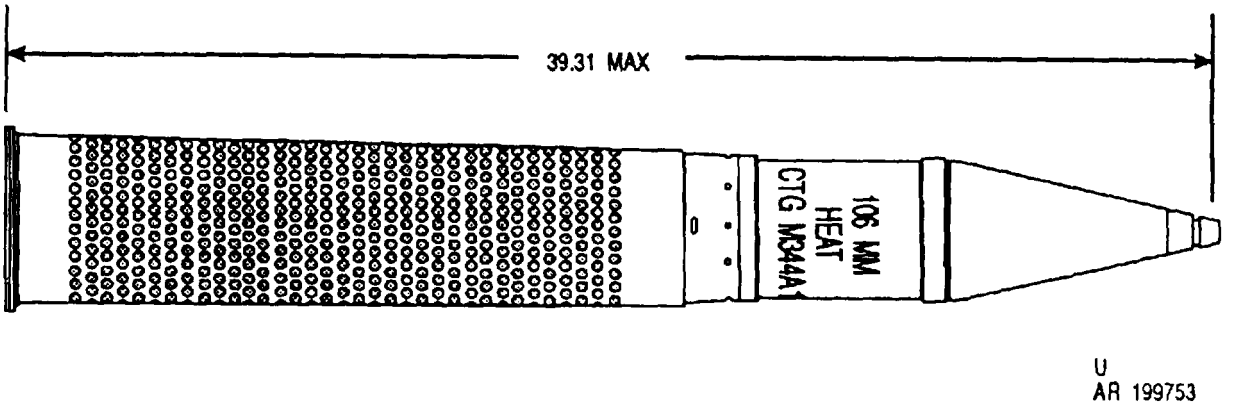
CARTRIDGE. 106-MILLIMETER: HEAT, M344A1 AND M344



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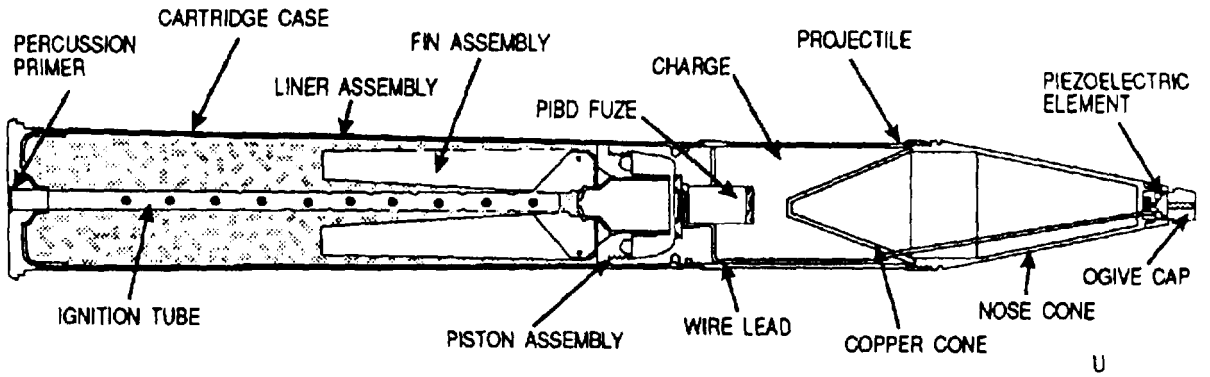

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AR 199752

Type Classification:

Std OTCM 3711959 dtd 1958.

Use:

This cartridge is used in 106mm recoilless rifles against armored targets.

Description:

The cartridge consists of a perforated, plastic-lined steel cartridge case crimped to a steel projectile containing a shaped charge. The nose cone adapter of the projectile carries a cap with a piezoelectric element to initiate the PIBD fuze in the base. A copper cone within the projectile shapes the charge. The hollow space within the cone and the adapter provides the appropriate standoff distance between target and shaped charge. An aluminum chamber threaded to the base of the projectile supports the fuze, six folding fins, and a piston assembly for opening the fins, The cartridge case is loosely filled with propellant, and the base is fitted with a percussion primer. The ignition tube of the primer extends through the propelling charge,

Functioning:

The primer ignites the propelling charge when struck by the firing pin. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the target. Recoil is eliminated by controlled escape of propellant gases to the rear through openings in the breech-block. Gas pressure also builds up in the piston in the projectile base. When the projectile leaves the muzzle, the piston moves rearward to extend the fins for stability in flight. On impact, distortion of the piezoelectric element generates an electrical charge and initiates fuze functioning to detonate the projectile, Explosion of the shaped charge collapses the copper cone and focuses a high velocity shock wave and a jet of metal particles that penetrates the target,

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Difference Between Models:

M344 has a propelling charge of 8.1 lb M1O, and the design of the projectile charge-shaping cone is different from M344A1,

Tabulated Data:

Complete round:	
Type	HEAT
Weight	37.23 lb
Lenght	39.31 in.
Cannon used with	M40A1, M40A1C
Projectile:	
Body material	Steel
Color:	
Old mfg	Olive drab w/yellow markings
New mfg	Black w/yellow markings
Filler and weight	Comp B, 2.79 lb
Components:	
Cartridge case:	
M344Al	M94B1
M344	M93 or M93B1
Propelling charge	M26 (M344A1); M10 (M344)
Primer	M57
Fuze	PIBD, M509A1
Performance:	
Maximum range	3000 m
Muzzle velocity	502.9 mps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F
Upper limit	+160°F (for periods not more than 3 days)
*Packing	1 round in fiber container; 2 containers in wooden box
*Packing box:	
Weight	120 lb
Dimensions	45-1/15 x 12-5/8 x 7-11/16 in.
Cube	2.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C650
Drawing number	7549097 (M344A1); 75-1-319 (M344)

References:

SB 700-20
AMC-P 700-3-3
TM 9-1000-205-12
TM 9-1300-251-20

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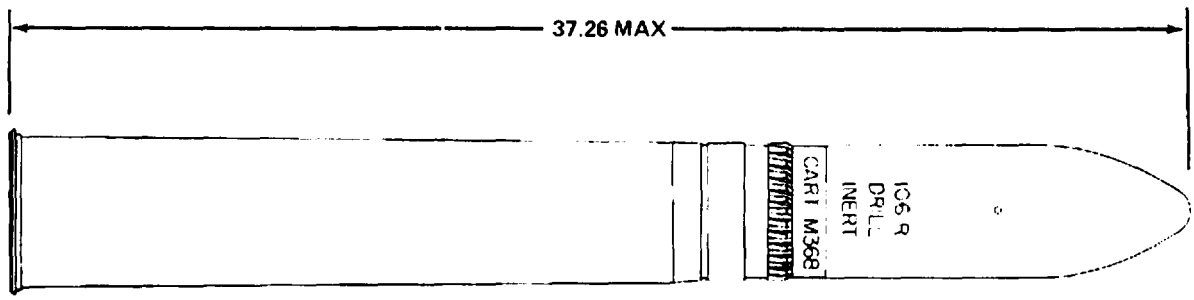
CARTRIDGE, 106-MILLIMETER: DUMMY, M368



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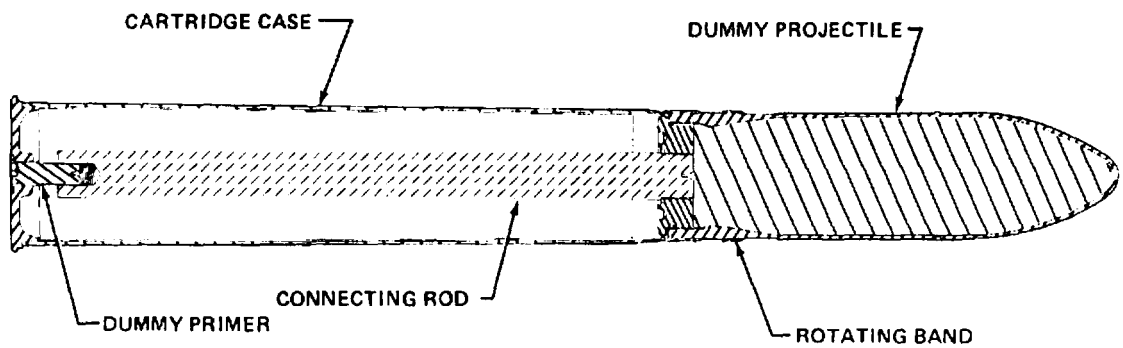

AR199750

Type Classification:

Std OTCM 36685 dtd 1958

Use:

This cartridge is used to train gun crews in loading and unloading ammunition for 106mm recoilless rifles.

Description:

The cartridge simulates HEP-T Cartridge M346Al, but because it is a drill round is completely inert and contains no propellant. A dummy cartridge case is crimped to a dummy projectile, and the components are further connected by a metal rod threaded into the base plug of the dummy projectile on one end and onto a dummy primer in the base of the cartridge case. A pre-engraved rotating band encircles the dummy projectile near the base for engagement with the barrel rifling of the weapon.

Functioning:

The round has no function other than practice loading.

Tabulated Data:

Complete round:	
Type	Dummy
Weight	37.93 lb
Length	37.26 in.
Cannon used with	M40A1, M40A1C
Projectile:	
Body material	Steel
Color:	
Old	Black or blue w/white markings
New	Bronze w/white markings
Filler and weight	Filler E, 7.75 lb
Cartridge case	M94B1
Primer	Dummy
*Packing	1 round in fiber container; 2 containers in wooden box

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*Packing Box:

Weight	127.6 lb
Dimensions	44-5/8 x 12-13/16 x 7-31/32 in.
Cube	2.6 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

DOT designation	AMMUNITION NON-EXPLOSIVE
DODAC	1315-C654
Drawing number	8596153

References:

SB 700-20
AMC-P 700-3-3
TM 9-1000-205-12
TM 9-1300-251-20

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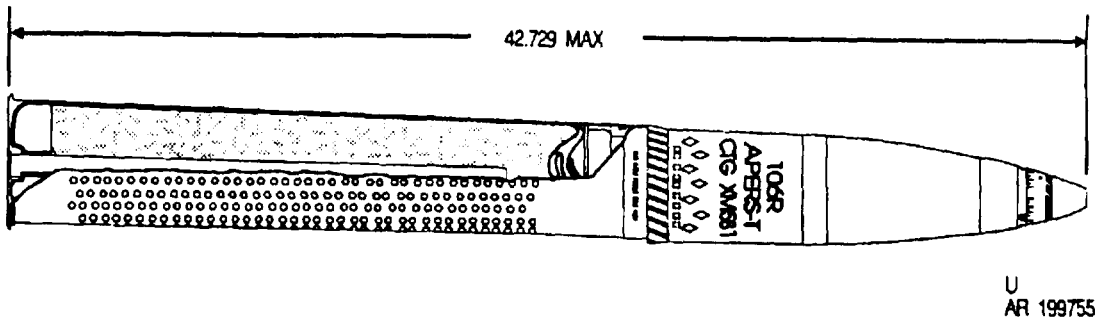
CARTRIDGE, 106-MILLIMETER: APERS-T, M581



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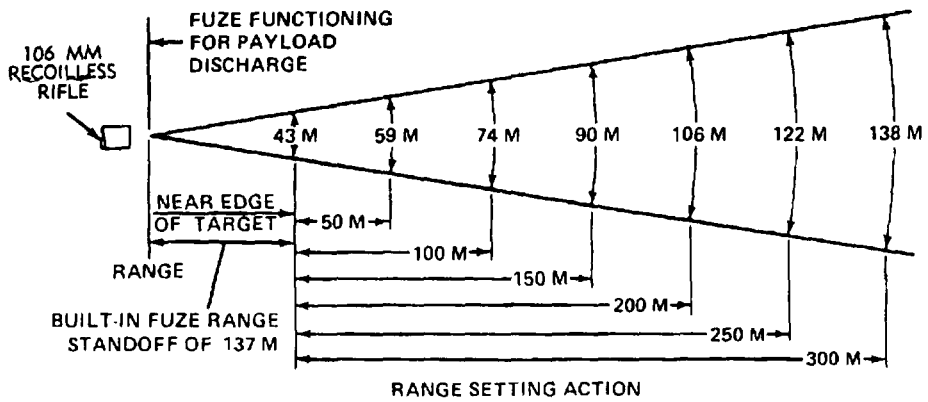
AR 199755



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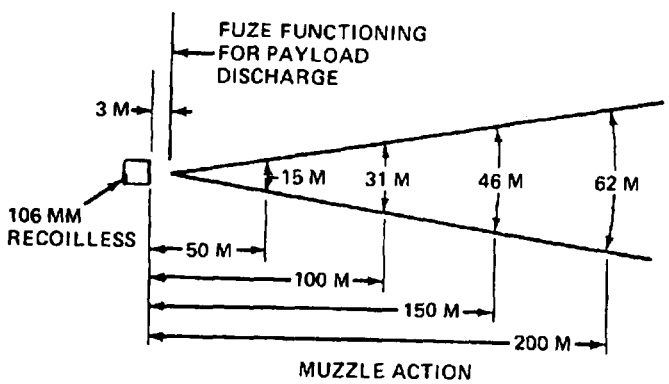

AR199725

Type Classification:

Std AMCTC 8416 dtd 1971.

Use:

This cartridge is fired from 106mm recoilless rifles to cause personnel casualties.

Description:

A perforated metal cartridge case is crimped to a projectile fitted at the nose with a fuze adapter, The propelling charge is contained within a plastic cartridge case liner. The base of the cartridge case contains a percussion primer with the igniter tube extending through the propelling charge. The projectile is loaded with 8 grain flechettes packed in separate bays, and also carries yellow dye marker in the two aft bays. The fuze adapter is equipped with four radially-spaced detonators for splitting the projectile. A fifth detonator with relay charge is installed for igniting an expelling charge in the base through a flash tube formed by the flechette bays. Two indexing buttons are

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provided on the forward bourrelet to facilitate indexing of the pre-engraved rotating band with the barrel rifling of the weapon. A tracer is threaded into the base of the projectile.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the rifle. The burning propellant ignites the tracer and generates rapidly expanding gases to propel the projectile through the barrel. Spin is provided by the rotating band for stability in flight, and trajectory visibility is provided by the tracer. Recoil is eliminated by controlled escape of propellant gases to the rear through openings in the breechblock. The fuze commences arming immediately upon firing, and will function on muzzle action or range, according to the setting. When the fuze functions, the four radial detonators in the adapter rupture the shell case. Simultaneously the axial detonator and relay explode the expelling charge in the base. The combination of forward force and centrifugal force from rotation results in a conical forward dispersion of flechettes. The yellow dye marks the function point.

Tabulated Data:

Complete round:	
Type	Antipersonnel
Weight	41.29 lb
Length	42.729 in.
Cannon used with	M40A1
Projectile:	
Body material	Aluminum and steel
Color:	
Old mfg.	Black w/white markings
New mfg.	Olive drab w/yellow band and white markings
Filler and weight:	
Flechettes	10.9 lb
Expelling charge	M9, 1.23 oz flake propellant
Yellow dye	11 grams
Detonators	(4) M86 (XM86); (1) XM87 with relay M7
Components:	
Cartridge case	M94B1
Propelling charge	M26
Primer	M57
Tracer	M13

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not more than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)
*Packing:	1 round fiber container; 2 containers in wooden box
* Packing box:	
Weight	134 lb
Dimensions	49-5/8 x 13 x 8-1/4 in.
Cube	2.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C660
Drawing number	9210603

Limitations:

Firing overhead of exposed friendly troops is prohibited.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1000-205-12
TM 9-1300-251-20

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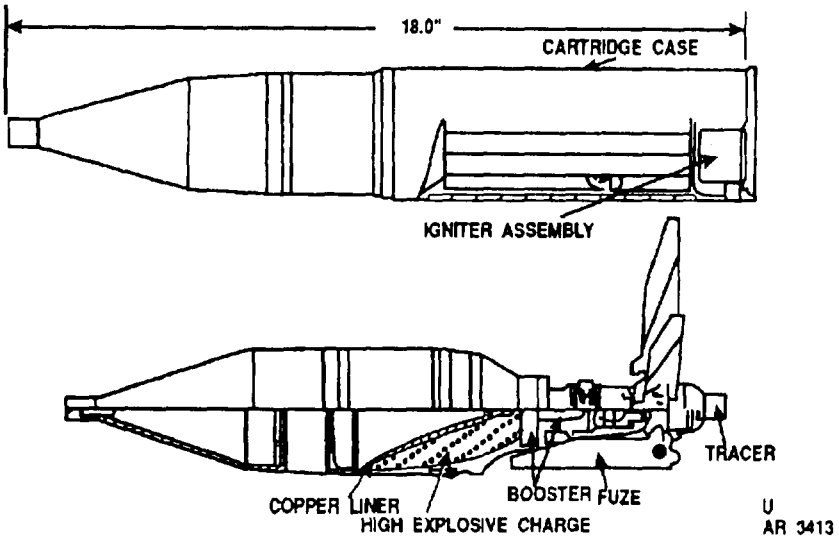
CARTRIDGE, 84-MILLIMETER: M136 (AT4) AND LAUNCHER



Type Classification:

M136 - STD

Use:

The AT4 is issued as a complete round of ammunition. It is factory loaded with one 84mm HEAT round and a disposable launcher.

Description:

The AT4 consists of a fiberglass reinforced launching tube fitted with a firing mechanism, sight, carrying sling, and protective covers. The recoilless design is superior to rocket-type weapons for this application. The fin-stabilized cartridge contains the projectile (warhead) and case assembly. The warhead is a shaped charge HEAT projectile with 84mm full caliber fuzing action. Detonation of the Octol explosive charge is achieved with a piezoelectric impact fuze sensitive to impact angles as shallow as ten degrees.

Functioning:

The trigger is pressed releasing the firing rod. The firing rod strikes a pin and ignites the percussion cap which ignites the propellant load. Pressure builds up in the launcher from burning propellant, the plastic baseplate breaks and gages exit rearward to balance the launcher recoil. Burning propellant expels the projectile from the launcher. The round hits the target and the shock is transmitted to the piezoelectric base detonating fuze. The fuze train detonates the charge which collapses the copper liner into a finger-shaped jet. The jet is preceded by extremely hot, high velocity gases which melt a hole in the target layer diode to the electric detonator, thus initiating the fuze. The fuze explosive train detonates the shaped charge which collapses the copper liner into a finger-shaped plasma jet. The high velocity jet, at tremendous pressure, melts a hole and penetrates the target. Almost simultaneously the body and standoff cone are blasted into small fragments.

Tabulated Data:

AT4 System:	
Model	M136
Weight	15 lb (6.8 kg)
Length	40 in.
Color	(No. 34087 per Fed Spec 595A, C6) Dime Drab
Code	Yellow on a one (1) inch wide black band
Arming distance (min)	15-25 m (49.21-82.02 ft)
Tactical Projectile:	
Length, as fired	18.19 in. (462mm)
Weight, as fired	3.97 lb (1.80 kg)
Body material	Aluminum
Caliber	84mm (3.35 in.)
Color	Black w/yellow marking
Explosive Charge:	
Shaped charge	0.97 lb (440g)
Type	70/30 Octol

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Booster:	
Explosive	16.4 g
Type	Composition A5
Cartridge case:	
Igniter	15.0 g (0.53 oz)
Propellant	0.78 lb (355 g)
Type (dble base)	AK13204
Configuration	Strips
Number strips	200
Other:	
Electronic detonator	1.57 g (0.06 oz)
Percussion cap	0.13 g (0.005 oz)
Fuze:	
Type	Point Initiating, Base Detonating (Piezoelectric)
Weight	0.93 lb (420g)
Packing:	
Each AT4	Sealed in plastic barrier
AT4's per wood container	5 ea
Gross weight	113 lb (51.26 kg)
Dimensions	44.37 x 35.43 x 8.35 in. (112.70 x 90 x 21.21 cm)
Cube	7.8 cu ft (0.22 cu m)
Pallet Load:	
Wood containers	4 ea
Gross weight	553 lb (250.84 kg)
Dimensions	44.49 x 35.63 x 40.98 in. (113 x 90.50 x 104.09 cm)
Cube	37.7 cu ft (1.07 cu m)

Shipping and Storage Data:

Storage class/SCG (Q-D)	1.1 E
DOT shipping class	A
DOT designation	ROCKET AMMUNITION WITH EXPLOSIVE PROJECTILE
Field storage	Group F
DODAC	1315-C995
Drawings:	
84mm HEAT Round AT4	13229923 (FFV Sweden)/ 28201800 (Honeywell U.S.)
84mm HEAT Shell	13229942 (FFV Sweden)/ 28201817 (Honeywell U.S.)
Box, Packed, Marked	13230240 (FFV Sweden)/ 28202869 (Honeywell U.S.)

References:

DOD Consolidated Ammunition Catalog, Ammo 1-2-3
TM 9-1300-251-34
TM 9-1315-886-12
AMC-P 700-3-3

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CHAPTER 6

AMMUNITION FOR GRENADE LAUNCHERS

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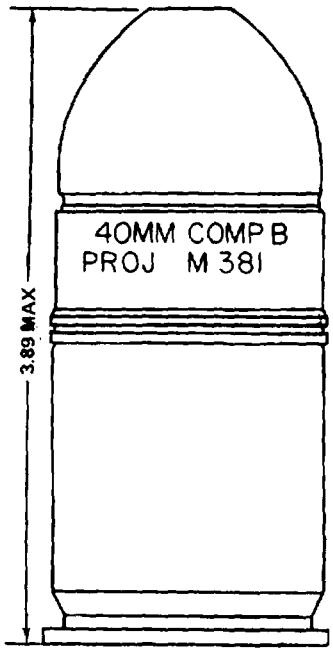
CARTRIDGE, 40-MILLIMETER: HE, M381



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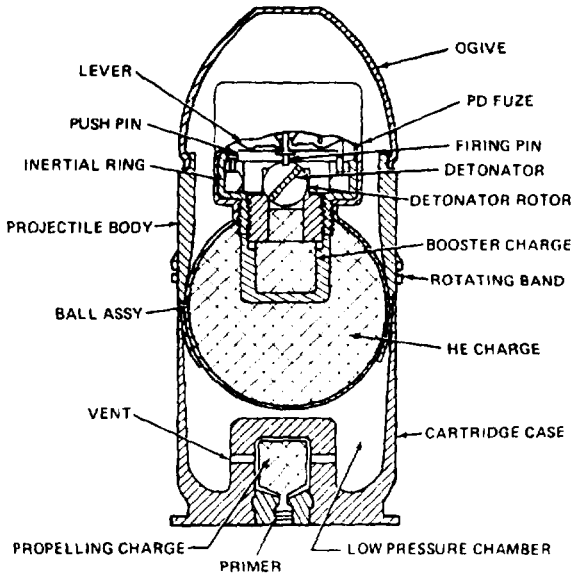

AR199575

Type Classification:

Std AMCTC 9392 dtd 1972

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from ground burst effect, and is fired from 40mm Grenade Launcher M79 or the M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a hollow, one-piece aluminum body containing rotating bands. A hollow aluminum ogive is fitted to the front end of the projectile. A hollow steel ball assembly containing the bursting charge is fitted into the rear of the projectile body. A booster charge with a PD fuze is threaded into a well in the forward side of the ball. The projectile assembly is press-fitted into a cartridge case. The case is a hollow, aluminum bichambered cylinder with an annealed brass propellant cup fitted into the cartridge base. The cup contains the propelling charge with a percussion primer in the center. The cup acts as a high pressure chamber and the hollow cavity in the case, which surrounds the cup, acts as a low pressure chamber. The fuze contains an inertial ring operating through push pins and levers upon a detonator.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube to impart spin of' 3600 RPM to the pro.jectile. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the launcher barrel with a muzzle velocity of 76 meters per second (250 fps). Setback force from firing causes the firing pin in the f'uze to be withdrawn from the rotor ball detent, and centrifugal force from projectile rotation causes the rotor ball assembly to allign the detonator with the explosive train. The fuze arms after the projectile has traveled approximately 2.4 to 3 meters (8 feet) from the launcher. Upon graze or impact with the target, inertia causes the inertial ring to act on the push pins, pivoting the levers inward to force the firing pin into the detonator. The detonator ignites the booster charge, and the booster detonates the

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explosive charge, producing blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:	
Type	HE
Weight	0.503 lb
Length	3.89 in.
Weapons used with	40mm Grenade Launchers M79 and M203 (attached to M16 series rifle)
Proiectile:	
Body material	Aluminum skirt and steel wire ball
Color	Olive drab w/yellow markings & yellow Ogive
Filler	Composition B, 32 g
Fuze	PD, M552
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	Percussion, M42
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.6°C)

	per wooden box
*Packing Box:	
Weight	54 lb (24. 5 kg)
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in. (45.0 x 36.2 x 29.3 cm)
Cube	1.7 cu ft (0.0475 cu m)

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Hazard class/division and storage compatibility group	(04) 1.2 E
UNO serial number	0321
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B568
Cartridge drawing number	8835941
Packing drawing numbers	8835104, 8835105

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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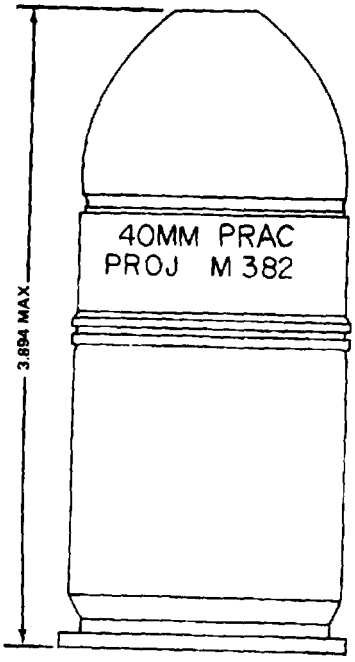
CARTRIDGE, 40-MILLIMETER: PRACTICE, M382



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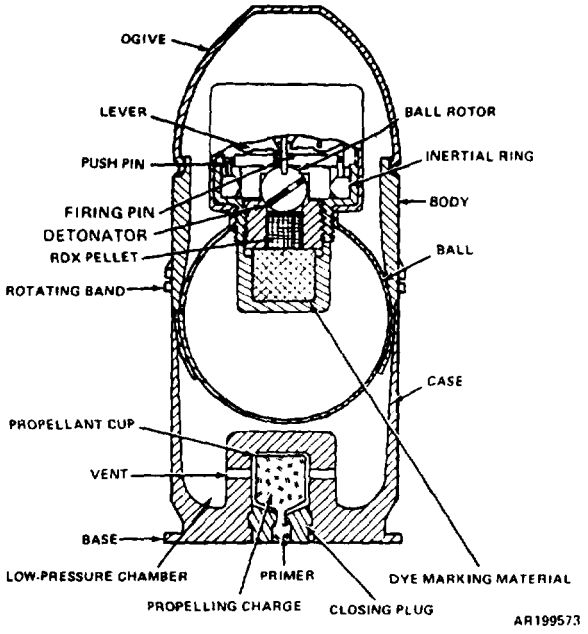

Type Classification:

Std AMCTC 2681 dtd 1964

Use:

This cartridge is a practice impact type round fired from 40-mm Grenade Launchers M79 or the M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile body and a cartridge case assembly containing a propelling charge and a percussion primer. A hollow, aluminum ogive is fitted to the front end of the projectile. Fitted in the rear of the projectile is a hollow steel ball assembly containing a yellow dye marking material. An RDX booster pellet with a PD fuze assembly is threaded into a cavity at the forward side of the ball assembly. The projectile assembly is press-fitted into the cartridge case. The case is a hollow aluminum bichambered cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base. The cup contains the propelling charge with a percussion primer in the center and acts as a high-pressure chamber. The hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber. The fuze contains an inertial ring operating through push pins and levers on the firing pin.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and to force the expanding gases from the burning propellant through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3600 rpm to the projectile and a muzzle velocity of 76 mps. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the laucher barrel. After the projectile leaves the launcher tube, setback force causes the firing pin in the fuze to be withdrawn from the ball detent, and centrifugal force created by rotation of the projectile causes the rotor ball assembly to align the detonator with the explosive train. The fuze arms after the projectile has traveled approximately 2.4 to 3 meters (8 feet) from the launcher. Upon graze or impact with the target, the inertial force from impact causes the inertial ring to act on the push pins, pivoting the levers inward, and forcing the firing pin into the detonator. The detonator explodes the RDX booster pellet which shatters

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the chamber and emits a yellow puff of smoke to simulate the explosion of a service round.

Tabulated Data:

Complete round:	
Type	Practice
Weight	0.50 lb
Length	3. 89 in.
Weapon used with	40mm Grenade Launchers M79, M203 (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt and steel ball
Color	Olive drab w/yellow markings
Filler and weight	Yellow dye, 4.54 g (inert)
Fuze	PD, M552
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (73.9°C)

*Packing	72 rounds per bandoleer; 12 bandoleers (72 rounds) per wooden box
*Packing Box:	
Weight	54 lb (24.5 kg)
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in. (45.0 x 36.2 x 29.3 cm)
Cube	1.7 cu ft (0.0475 cu m)

*NOTE: See DOD consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B577
Cartridge drawing number	8844607
Packing drawing numbers	8835104, 8835105

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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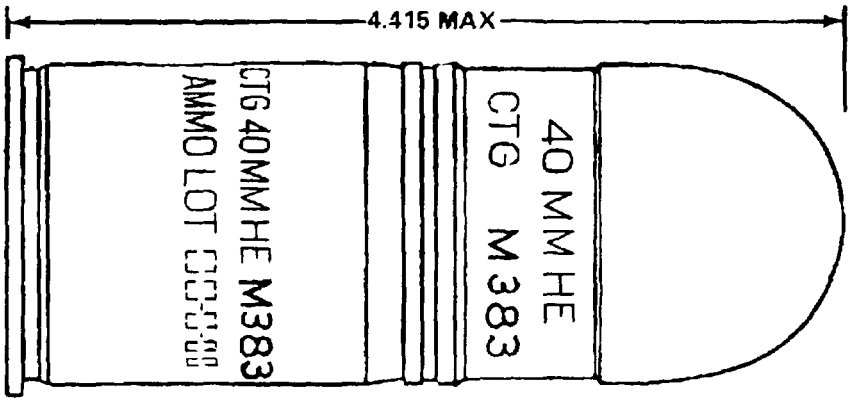
CARTRIDGE, 40-MILLIMETER: HE, M383



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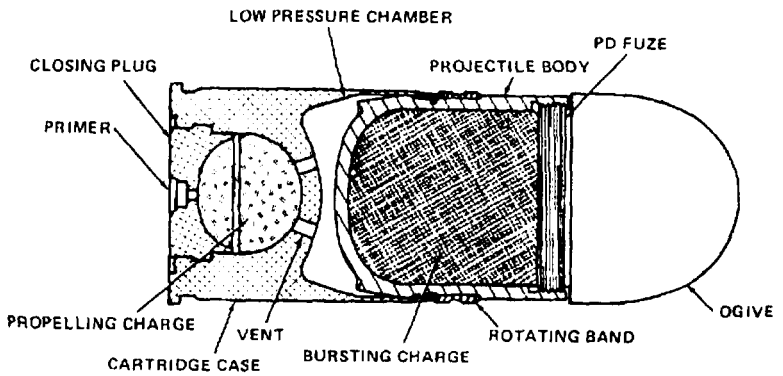

AR199571

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive round designed to inflict personnel casualties in the target area using ground burst effect, and is fired from M75 or M129 40mm grenade launchers and the U.S. Navy 40mm machine gun MK19 Mod 1, at ranges up to 2200 meters. The cartridge is issued completely assembled in linked belts of 50 rounds. Recrimped rounds can be fired in the MK19 MOD 3 GMG.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece internally embossed steel projectile body with a metal rotating band, and a cartridge case assembly containing the propelling charge and percussion primer. A PD fuze is threaded into the front-end of the projectile and is enclosed with an aluminum ogive. The projectile cavity contains a Composition A5 bursting charge. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug fitted into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high pressure propellant chamber. This chamber has vent holes in the top and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant in the high-pressure chamber are forced through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 reps. After the projectile leaves the launcher tube, setback forces cause the fuze setback pin, which keeps the rotor out of line

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with the detonator, to be disengaged from the rotor. The rotor is secured in position by a centrifugal lock which engages the star wheel in the timing mechanism of the fuze assembly. The centrifugal lock releases the star wheel and arming of the fuze begins when the projectile attains sufficient spin. The rotor springs start rotation of the rotor which is sustained by centrifugal force. The escapement assembly delays arming of the fuze for approximately 0.07 to 0.16 seconds. The rotor is then locked in the armed position, and the fuze is armed at approximately 18 to 36 meters from the launcher tube. Upon graze or impact with the target, the inertial force from impact causes bracket weights to pivot inward forcing the firing pin into the detonator. Concurrently, the detonator detonates the explosive charge causing a blast and fragmentation of the projectile body.

Tabulated Data:

NSN 1310-00-976-0907	US Army Pack
NSN 1310-00-196-2654	US Marine Corps Pack (Recrimped)
Complete round:	
Type	HE
Weight	0.75 lb
Length	4.415 in.
Weapons used with	M75, M129 40mm grenade launchers MK19 Mod 1, MK19 Mod 3, 40mm machine guns
Projectile:	
Body material	Blank and draw steel
Color	Olive drab w/yellow markings and yellow ogive
Filler and weight	RDX, Comp A5, 54.5 g
Fuze	PD, M533
Propelling charge:	
Cartridge case	M169
Propellant	M2, 4.64 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)
Arming distance	18 to 36 m (59 - 118 ft)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (+51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (+73.9°C)

U.S. Army Pack:

*Packing	50 rounds in linked belt
*Packing box:	
Weight	53 lb
Dimensions	26-3/8 x 16-1/4 x 6-3/16 in.
Cube	1.5 cu ft
Packing drawing number	9251995

U.S. Marine Corps Pack:

*Packing	48 rounds in linked belt
*Packing box:	
Weight	59.5 lb
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in.
Cube	1.3 cu ft
Packing drawing number	9362543

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatability group	1.1 E
DOT class	Class A Explosives)
DOT marking	AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILES
DODAC	1310-B571
Cartridge drawing number	9241371
Packing drawing number	9251995

References:

SB 700-20
TM 9-1300-251-20
TM 9-1010-230-10
TM 9-1010-230-23&P
TM 9-1300-251-34

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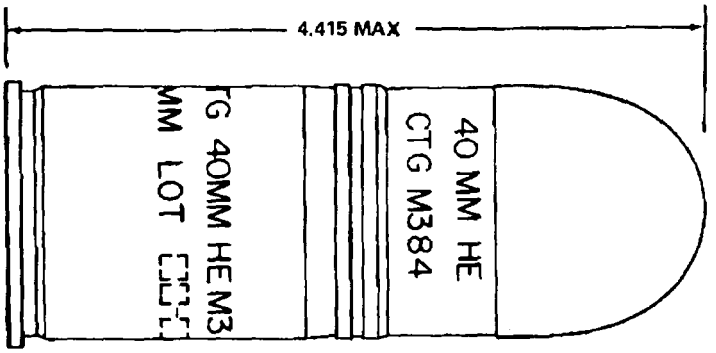
CARTRIDGE 40-MILLIMETER: HE, M384



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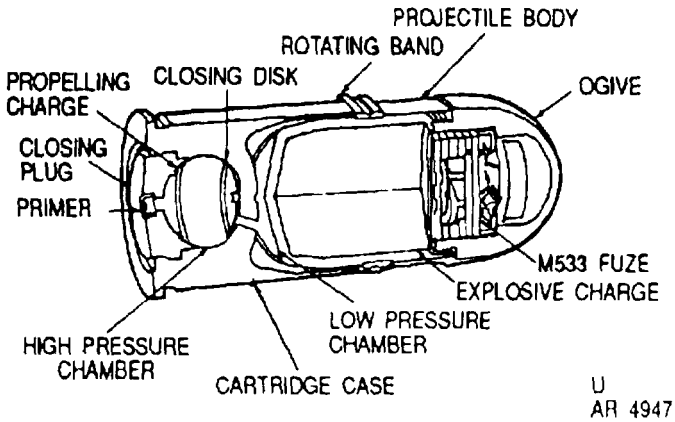

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive round designed to inflict personnel casualties in the target area using ground burst effect, and is fired from M75 and M129 40mm grenade launchers or the U.S. Navy 40mm machine gun MK19 Mod 1, at ranges up to 2200 meters. The cartridge is issued fully assembled in linked belts of 50 rounds.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece, internally embossed steel projectile body with a metal rotating band and a cartridge case assembly containing the propelling charge and percussion primer. A PD fuze is threaded into the front end of the projectile, and is enclosed with an aluminum ogive. The projectile cavity contains Composition A5 bursting charge. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug fitted into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high-pressure propellant chamber. This chamber has vent holes in the top and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber and are forced through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressue chamber force the projectile through the barrel with a muzzle velocity of 244 reps.

After the projectile leaves the launcher tube, setback force causes the fuze rotor setback pin to be disengaged from the rotor. The

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rotor is secured in position by a centrifugal lock which engages the star wheel in the timing mechanism of the fuze assembly. The centrifugal lock releases the star wheel and arming of the fuze begins when the projectile attains sufficient spin. The rotor springs start rotation of the rotor which is sustained by centrifugal force. The escapement assembly delays arming of the fuze for approximately 0.07 to 0.16 seconds, The rotor is then locked in the armed position, and the fuze is armed at approximately 18 to 36 meters from the launcher. Upon graze or impact with the target, inertial force from impact causes bracket weights to pivot inward forcing the firing pin into the detonator, Concurrently the detonator detonates the explosive charge which in turn detonates the bursting charge producing blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:	
Type	HE
Weight	0.75 lb
Length	4.415 in.
Weapons used with	M75, M129 grenade Launchers MK19 Mod 1, MK19 40mm machine gun
Projectile:	
Body material	Plate steel
Color	Olive drab w/yellow markings and yellow ogive
Filler and weight	Comp A5, 54.5 g
Fuze	PD, M533
Propelling charge:	
Cartridge case	M169
Propellant	M2, 4.64 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)
Arming distance	18 to 36 m (59 - 118 ft)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (+51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (+73.9°C)
*Packing	50 rounds in linked belt
*Packing Box:	
Weight	53 lb
Dimensions	26-3/8 x 16-1/4 x 6-3/16 in.
Cube	1.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR EXPLOSIVE PROJECTILE
DODAC	1310-B470
Cartridge drawing number	8886397
Packing drawing number	9251995

References:

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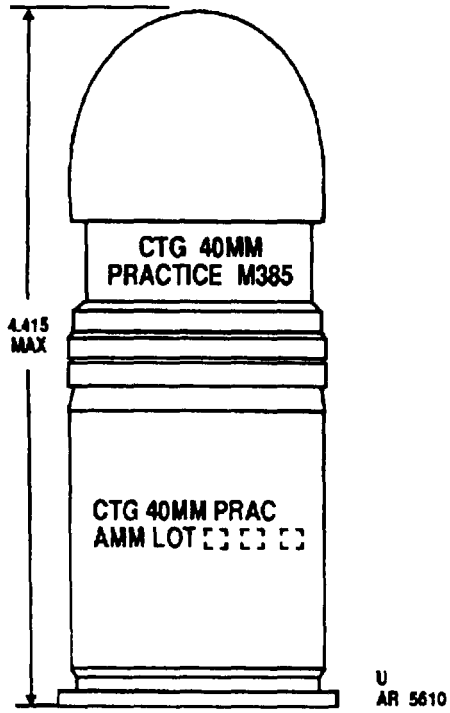
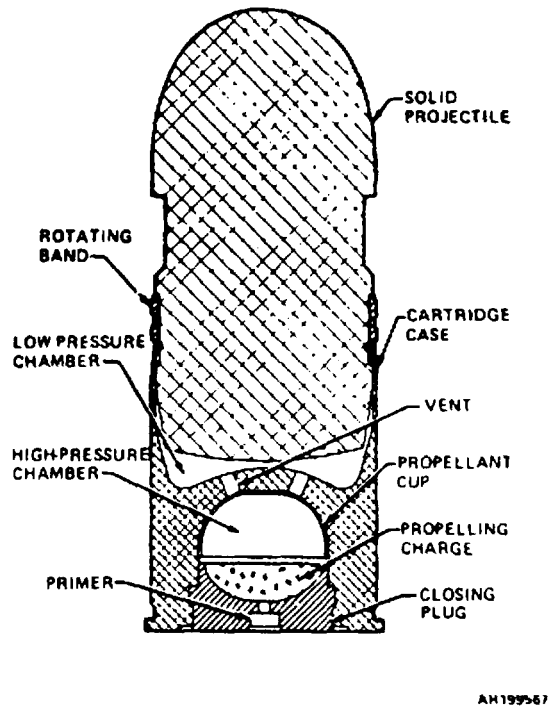
CARTRIDGE, 40-MILLIMETER: PRACTICE, M385





Type Classification:

Std AMCTC 2177 dtd 1964

Use:

This cartridge is fired from 40mm Grenade Launchers M75 and M129 and 40mm Machine Gun MK19, Mod 1 and Mod 3. The cartridge is designed only for practice or for proof testing weapons.

Description:

This cartridge is a fixed round of ammunition. It consists of a one-piece solid inert aluminum projectile body together with a metal rotating band which is press-fitted into an aluminum bichambered cartridge case assembly. The case contains the propelling charge and percussion primer.

The propelling charge is contained in a spherical high-pressure propellant chamber with vent holes in the top. The chamber is sealed at the bottom with an aluminum base plug which is crimped to the base of the cartridge case. The hollow upper chamber in the case acts as a low-pressure chamber. A percussion primer is crimped into the center of the case closing plug.

Functioning:

The weapon firing pin strikes the percussion primer to ignite the propelling charge. The expanding gases from the burning propellant are forced from the high-pressure chamber, through vent holes into the low-pressure chamber. The rotating band around the plojectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 244 meters per second. Because it is inert, the projectile does not function upon impact with the target.

Tabulated Data:

Complete round:

Type	Practice
Weight	350 g
Length	4.415 in.
Weapons used with	M75, M129 40mm Grenade Launchers MK19, Mod 1, MK19, Mod 3, 40mm machine guns

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Projectile:	
Body material	Bar alloy aluminum
Color	Blue w/black markings
Propelling charge:	
Cartridge case	M169
Propellant	M2, 4.2 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)

Temperature Limits:

Firing:	
Lower limit	-25°F (-31.5°C)
Upper limit	+110°F (+43°C)
Storage:	
Lower limit	-30°F (-34°C)
Upper limit	+145°F (+62.5°C)
*Packing	50 rounds in linked belt
*Packing Box:	
Weight	53 lb
Dimensions	26-3/8 x 16-1/4 x 6-3/16 in.
Cube	1.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B480
Cartridge drawing number	8886326
Packing drawing number	9251995

References:

SB 700-20
TM 9-1010-230-10
TM 9-1010-230-23&P
TM 9-1300-251-20
TM 9-1300-251-34

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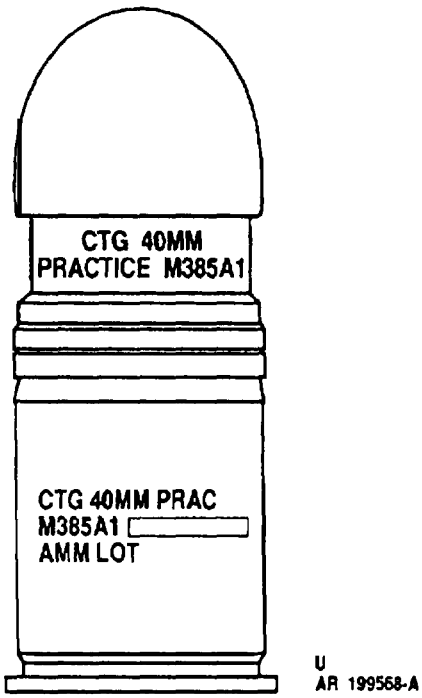
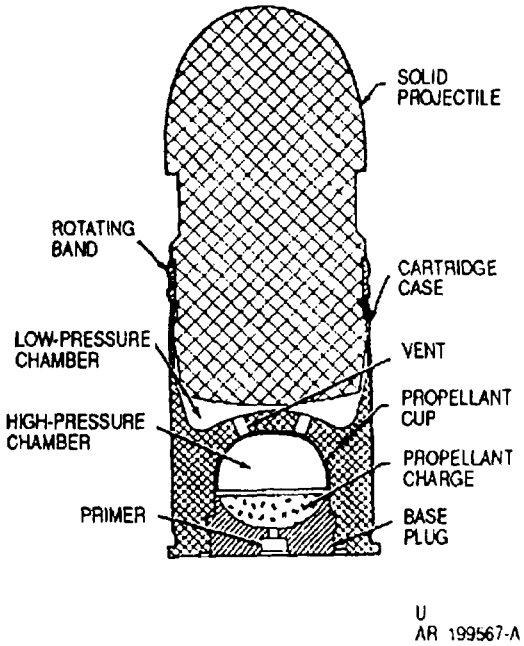
CARTRIDGE, 40-MILLIMETER: PRACTICE, M385A1





Type Classification:

Std AMSR 12876002

Use:

This practice cartridge is fired from 40mm Grenade Launcher M75 and 40mm Grenade Machine Gun MK19 Mod 3. The cartridge is designed only for practice or for proof testing weapons. Not authorized for use in M129 Grenade Launcher.

Description:

This cartridge is a fixed round of ammunition. It differs from the M385 cartridge in that the ogive matches the shape of the M430 projectile ogive. It consists of a one-piece solid inert aluminum projectile body together with a metal rotating band which is press-fitted into an aluminum bichambered cartridge. The case contains the propelling charge and percussion primer.

It is linked only with the M16A2 link, whereas the M385 is linked with either M16A1 or M16A2 links. The propelling charge is contained in a spherical high-pressure propellant chamber with vent holes in the top. The chamber is sealed at the bottom with an aluminum base plug which is crimped to the base of the cartridge case. The hollow upper chamber in the case acts as a low-pressure chamer. A percussion primer is crimped into the center of the case closing plug.

Functioning:

The weapon firing pin strikes the percussion primer to ignite the propelling charge. The expanding gases f'rom the burning propellant are forced from the high-pressure chamber, through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the tube vith a muzzle velocity of 242 meters per second. Because it is inert, the projectile does not function upon impact with the target.

Tabulated Data:

Complete round:

Type	Practice
Weight	0.77 lb (350 g)
Length	4.415 in. (11.214 cm)

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Weapons used with	40mm Grenade Launcher MK19 Mod 3, 40mm machine gun
Projectile:	
Body material	Bar alloy aluminum
Color	Blue w/black markings
Propelling Charge:	
Cartridge case	M169
Propellant	M2, 4.2 g
Primer	Percussion, FED 25
Performance:	
Maximum Range	2,200 m (7217.85 ft)
Muzzle velocity	242 mps (795 fps)

Temperaturc Limits:

Firing:	
Lower limit	-25°F (-31.5°C)
Upper limit	+110°F (+43°C)
Storage:	
Lower limit	-30°F (-34°C)
Upper limit	+145°F (+62.5°C)

*NSN: 1310-01-159-3184

Packing	48 rounds in linked belt
Packing Box:	
Weight	59.5 lb (26.99 kg)
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in. (47.23 x 37.07 x 21.07 cm)
Cube	1.3 cu ft (0.04 cu m)
Packing drawing number	9362543

NSN: 1310-01-316-9973

Packing	32 rounds ln linked belt
Packing Box Metal PA-120:	
Weight	42 lb (18.14 kg)
Dimensions	18.76 x 10.39 x 6.36 in. (47.65 x 26.39 x 16.15 cm)
Cube	0.72 cu ft (0.02 cu m)
Packing drawing number	12928042

NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0338
Hazard class/division and storage compatibility group	(04) 1.4 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B576
Cartrldge drawing number	8886326

References:

DOD Consolidated Ammunition Catalog SB 700-20
TM 9-1010-230-10
TM 9-1010-230-23&P
TM 9-1300-251-20
TM 9-1300-251-34

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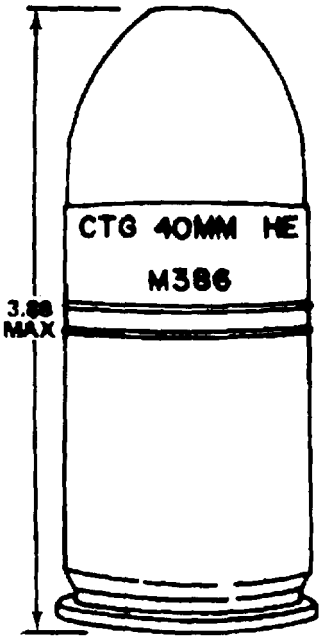
CARTRIDGE, 40-MILLIMETER: HE, M386



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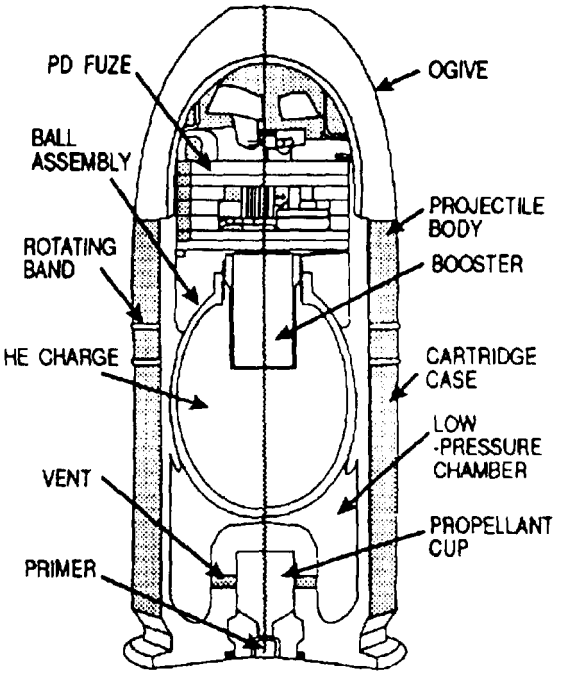

U
AR 199565

Type Classification:

Con MSR 11756003

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from ground burst effect and is fired from 40mm Grenade Launcher M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band, and cartridge case containing the propelling charge and percussion primer, a steel ball-shaped assembly containing the high explosive charge is fitted into the rear of the projectile. The ball assembly has an open-well on the forward side. A PD fuze with booster charge is threaded into the well. The fuze is covered by an aluminum ogive forming the nose of the projectile. The projectile body is press-fitted into the cartridge case. The case is a bichambered aluminum cylinder with an annealed brass propellant cup fitted into the center of the base. The cup contains the propelling charge and the percussion primer is fitted in the center. The cup acts as a high-pressure chamber while the cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and force the exploding gases through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting spin to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the tube with a muzzle velocity of 76 meters per second. After the projectile leaves the launcher tube, setback causes a fuze setback pin to move reward and clear the fuze rotor which is held in an unarmed position by a firing pin, centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes three pivoted inertial weights and the fuze centrifugal lock to move outward. This action causes the spring loaded firing pin and lock to retract from the rotor and gear train, respectively. The rotor, now free to rotate, aligns the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled

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at least 14 meters (45 feet) from the launcher tube. Upon impact with the target, the firing pin is forced into the detonator. The detonator triggers the booster charge, in turn, detonating the high-explosive bursting charge, producing a blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:	
Type	HE
Weight	0.50 lb
Length	3.89 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt and steel ball with explosive filler
Color	Olive drab w/yellow markings and yellow ogive
Filler	Composition B, 32 g
Fuze	PD, M551
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	Percussion, M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds per bandoleer; 12 bandoleers (72 rounds) per box
Packing Box:	
Weight	54 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILES
DODAC	1310-B574
Cartridge drawing number	8835951
Packing drawinng number	8835948

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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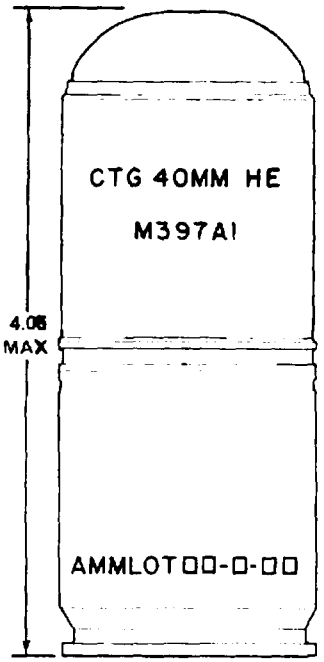
CARTRIDGE, 40-MILLIMETER: HE, M397A1



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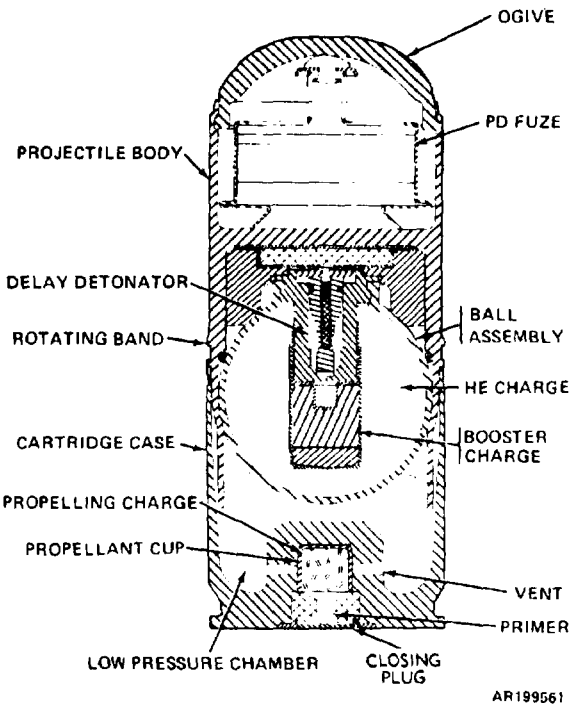

AR199561

Type Classification:

Std MSR 08746022 dtd 1974

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using air burst effect, and is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece steel projectile body with a metal rotating band and a cartridge case assembly containing the propelling charge and percussion primer. A hollow ogive is fitted to the front end of the projectile. A hollow steel ball assembly containing a delay detonator, a booster charge, and an HE bursting charge, is fitted into the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base.

The cup contains the propelling charge and a percussion primer in the center. The cup acts as a high-pressure chamber, and the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases from the burning propellant through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube, imparting spin to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract f'rom the fuze rotor causing the bellville type washer to be crushed. This permits the fuze housing assembly containing the rotor to retract from the stationary fuze firing pin. In the unarmed position, a set-back pin, a firing pin, and a centrifugal lock in the fuze assembly, combine to prevent movement of the rotor. This keeps the fuze detonator from aligning with the separation charge assembly. Centrifugal force, from

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rotation of the projectile, causes the centrifugal lock to retract from the fuze gear train. The rotor, now free to rotate, lines up the detonator with the separation charge assembly. A fuze escapment mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 meters (45 feet) from the launcher tube. Upon impact with the target, the M55 detonator within the setback sleeve and housing assembly is driven forward into the firing pin. In turn, the detonator ignites the separation charge assembly which initiates the delay detonator of the auxiliary fuze in the ball assembly. Gas pressure drives the delay detonator into the armed position. Concurrently, the ball assembly with the auxiliary fuze ejects from the rear of the projectile into the air. The pyrotechnic delay detonator in the ball assembly detonates the booster charge, in turn, detonating the bursting charge 80 milliseconds after ejection. This results in a blast and fragmentation of the ball assembly 5 feet above the impact point. This cartridge functions with improved performance on snow targets in comparison to the performance of M397 and M406.

Tabulated Data:

Complete round:	
Type	H E
Weight	0.51 lb
Length	4.05 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt with steel ball containing explosive filler
Color	Olive drab w/yellow markings and yellow ogive
Filler	OCTOL, 32 g
Fuze	PD, M536E1
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)
Arming delay distance	14 to 27 m (45 to 90 ft)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds per bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box:	
Weight	58 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in.
Cube	1.7 cu ft

*Note: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B569
Cartridge drawing number	P9233158
Packing drawing number	882362

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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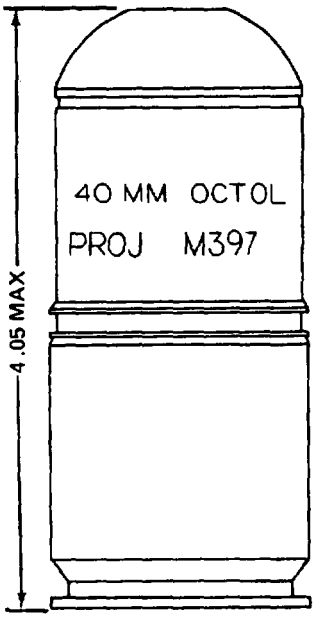
CARTRIDGE, 40-MILLIMETER: HE, M397



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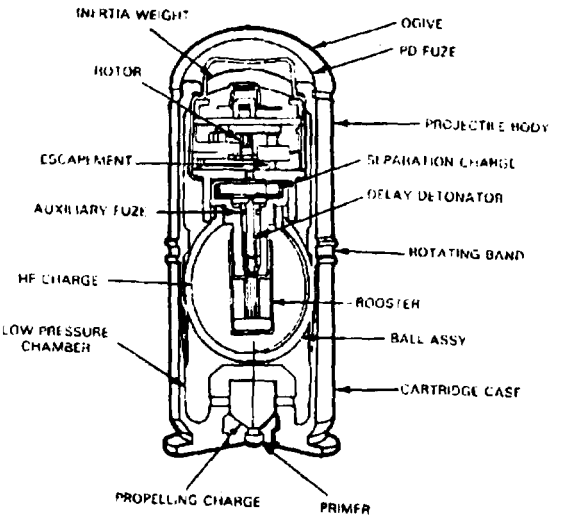

ARD 85-2557

Type Classification:

Std MSR 08746022

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using air burst effect, and fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round consisting of an aluminum projectile body with rotating band press-fitted into a cartridge case containing a propelling charge and percussion primer. A hollow steel ball assembly containing the HE charge and a delay detonator is fitted into the rear of the projectile. A PD fuze with a separation charge is threaded into a well on the front side of the ball. The cartridge case is a bichambered aluminum cylinder with an annealed brass cup pressed into the center of the base. The cup contains the propelling charge and the percussion primer extends into the center of the charge. The cup constitutes a high--pressure chamber, and the hollow cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer to ignite the propelling charge. The burning propellant ruptures the propellant cup, and the expanding-gases are vented into the low-pressure chamber to propel the projectile through the tube with a muzzle velocity of 76 meters per second. The rotating band engages the spiral lands in the launcher tube to impart spin to the projectile. Setback from firing withdraws a lock pin from the fuze rotor. After the projectile leaves the launcher, centrifugal force from rotation withdraws the firing in from the rotor and releases a centrifugallock from the fuze gear train. The rotor then turns, restrained by an escapement mechanism, to line up the rotor detonator with the separation charge. This rotor movement is complete when the projectile has traveled at least 14 meters (45 feet) from the weapon. Upon impact, the fuze firing pin is driven into the detonator to explode the separation charge. The separation charge ejects the high explosive assembly upward from the rear of the projectile and simultaneously ignites the delay charge. Detonation and fragmentation of the HE ball thus occurs at approximately 5 feet above the ground impact point.

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Tabulated Data:

Complete round:	
Type	HE
Weight	0.51 lb
Length	4.05 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt and steel ball containing explosive filler
Color	Olive drab w/yellow marking and yellow ogive
Filler	OCTOL, 32 g
Fuze	PD, M536
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)
Arming distance	14 to 27 m (45-90 ft)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds packed in plastic bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box:	
Weight	58 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data Including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B569
Cartridge drawing number	8883461
Packing drawing number	8882362

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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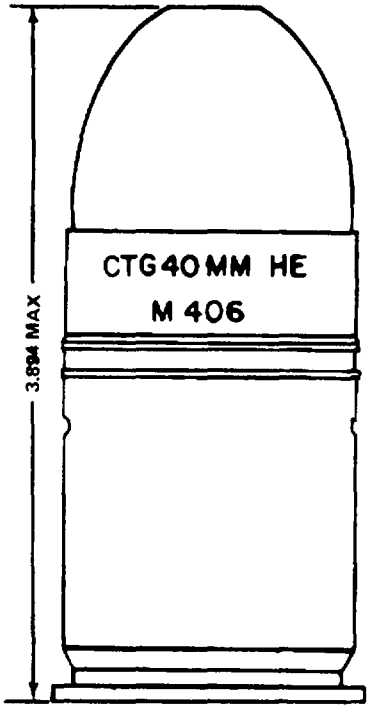
CARTRIDGE, 40-MILLIMETER: HE, M406



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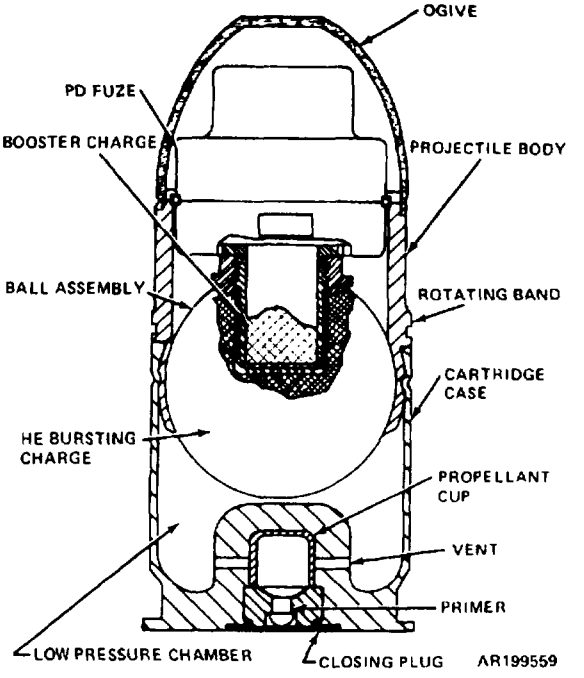

Type Classification:

Std AMCTC 9392 dtd 1972

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using ground burst effect, and is fired from 40mm Grenade Launchers M79 or M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band and a cartridge case assembly containing the propelling charge and percussion primer. A hollow aluminum ogive is fitted to the front end of the projectile. A steel ball assembly containing a booster charge and a bursting charge is fitted in the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is pressfitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base. The cup contains the propelling charge and a percussion primer in the center. It acts as a high-pressure chamber while the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor. The rotor is held in an unarmed position by a firing pin, a centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes the three pivoted inertia weights and the centrifugal lock in the fuze to move outward. In turn, the spring loaded firing pin and the lock retract from the rotor and fuze gear train, respectively. The rotor, now free to rotate, lines up the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 meters (45 feet) from the launcher

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tube. Upon impact with the target, the firing pin is forced into the detonator. Concurrently the detonator triggers the booster charge, in turn, detonating the high explosive bursting charge, which produces a blast and fragmentation of the projectile body. The projectile body is wire wrapped so that fragmentation is more uniform on impact.

Tabulated Data:

Complete round:	
Type	HE
Weight	0.503 lb
Length	3.894 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt with steel ball
Color	Olive drab w/yellow markings and yellow ogive
Filler and weight	Comp B, 32 g
Faze	PD, M551
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (247 fps)
Arming distance	14 to 27 m

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-66°F (-53.8°C)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds per bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box:	
Weight	54 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B568
Cartridge drawing number	8835950
Packing drawing number	8835104, 8835105

References:

SC 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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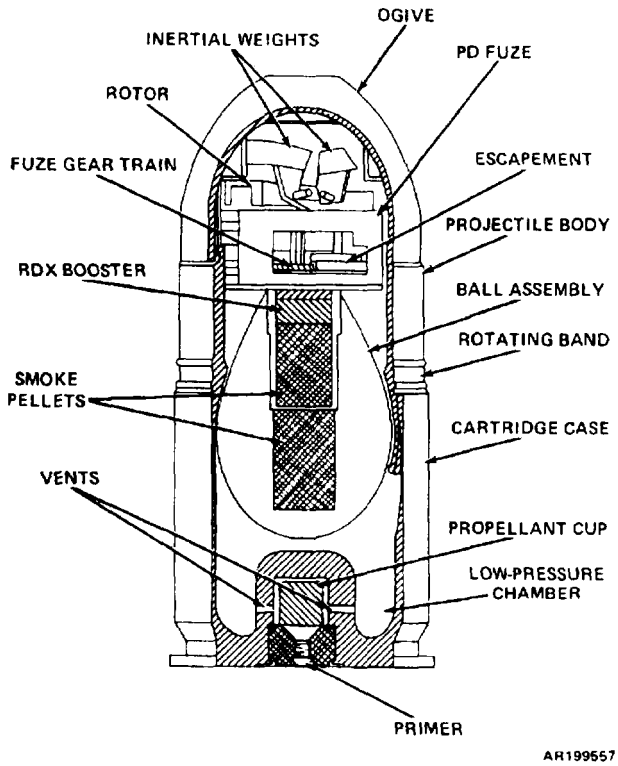
CARTRIDGE, 40-MILLIMETER: PRACTICE, M407A1



Type Classification:

Std AMCTC 2681, dtd 1964

Use:

This cartridge is a fixed practice type ammunition designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band and a cartridge case assembly. A hollow aluminum ogive is fitted to the front end of the projectile. A plastic ball assembly containing an RDX booster pellet and two yellow smoke pellets is fitted into the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly crimped into the center of the cartridge base. The cup contains the propelling charge and percussion primer in the center. The cup acts as a high-pressure chamber while the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and to release the expanding propellant gases through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor. The rotor is held in an unarmed position by a firing pin, a centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes the three pivoted inertia weights and the centrifugal lock in the fuze, to move outward. In turn, the spring loaded firing pin and the lock retract from the rotor and fuze gear train, respectively. The rotor, now free to rotate, lines up the fuze detonator with the explosive train. A fuze escapement mechanism delays arming. by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 to 27 meters (45 to 90 feet) from the launcher tube. Upon impact

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with the target, the firing pin is forced into the detonator. Concurrently, the detonator ignites the RDX booster pellet which fragments the plastic ball and ignited the two yellow smoke pellets, causing a puff of yellow smoke which simulates explosive impact.

Tabulated Data:

Complete round:	
Type	Practice
Weight	0.50 lb
Length	3.894 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt and plastic ball
Color	Blue w/white markings
Filler and weight	Yellow dye
Fuze	PD, M551
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (249 fps)

Temperature Limits:

Firing:	
Lower limit	-25°F (-31.5°C)
Upper limit	+110°F (43°C)
Storage:	
Lower limit	-30°F (-34°C)
Upper limit	+145°F (62.5°C)
*Packing	6 rounds per bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box:	
Weight	54 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CAR TRIDGES, PRACTICE AMMUNITION
DODAC	1310-B577
Cartridge drawing number	8835952
Packing drawing numbers	8835104, 8835105

References:

TM 9-1010-205-10
TM 9-1010-221-10
SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

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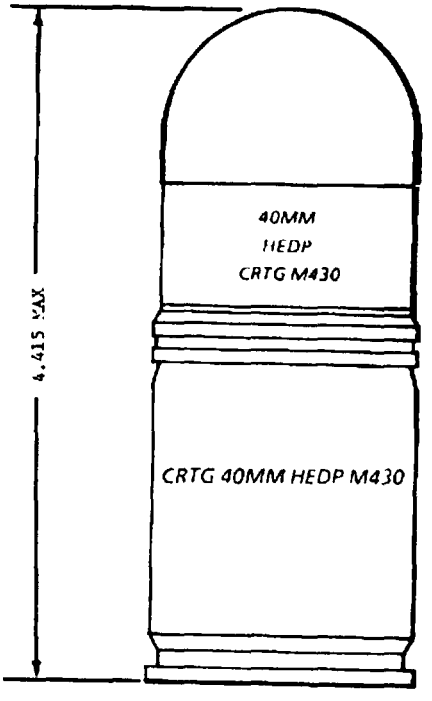
CARTRIDGE, 40-MILLIMETER: HEDP, M430, M430A1



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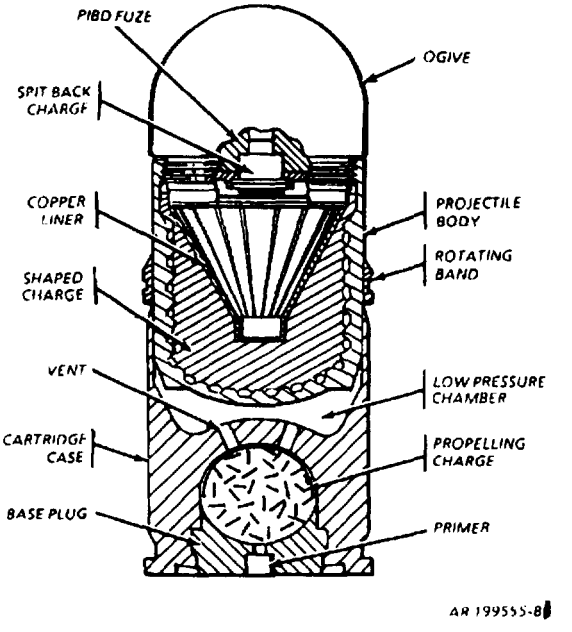

Type Classification:

Std AMCTC 8664 dtd 1971
Std LCC-A MSR 10926030 dtd 1992- M430A1

Use:

This cartridge is a high explosive, dual purpose, impact type round designed to penetrate two inches (three inches for the M430A1) of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40mm Machine Gun MK19 Mod 3. Not authorized for use in M129 Grenade Launcher.

Description:

This cartridge is a fixed round of ammunition with an internally embossed steel projectile body containing a high explosive charge of Comp A5 and a copper liner. The liner in the M430A1 is slightly longer so there is less Comp A5. A PIBD fuze, integral with the ogive and containing a spit-back charge, is threaded into the loaded body forming the complete projectile. An M169 Cartridge Case Assembly is crimped to the projectile. The case is a hollow, bichambered aluminum cylinder with vents connecting the chambers. The propellant chamber, which contains the propelling charge, is sealed at the rear by a base plug. A percussion primer is crimped into the center opening in the base plug. The propellant chamber acts as a high-pressure chamber, and the forward hollow cavity in the case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Pressure, generated by the burning propellant in the high-pressure chamber, forces the expanding gases through the vent holes into the low-pressure chamber, and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube, imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel attaining a muzzle velocity of 241 meters per second. Prior to firing, the detonator in the fuze rotor is held out of line by the position of the setback pin against the rotor and gear assembly. Upon firing, setback force frees the rotor from the pin. The spin of the projectile causes the safety spring assembly to disengage from the rotor and gear assembly. The detonator then begins to move toward the armed position under the influence of centrifugal force on the eccentrically located rotor. The movement of the rotor and gear assembly is resisted by an escapement mechanism, providing the required time delay in the arming of the fuze. The deto-

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nator reaches the armed position when the projectile has traveled a distance of 18 to 40 meters from the launcher. Upon impact with the target, the firing pin is driven into the detonator. The effect of the detonator initiates the spitback charge producing a jet which in turn initiates the main charge. Detonation of the main charge provides both the armor piercing effect of the shaped charge and fragmentation of the steel body.

Tabulated Data:

M430:
- NSN 1310-00-867-6609 -US Army Pack
- NSN 1310-01-159-8043- M548 US Marine Corps Pack
- NSN 1310-01-319-1541- PA 120 US Army Pack
- NSN 1310-01-362-5296- PA 120 US Marine Corps Pack

M430A1:
- NSN 1310-01-350-0247- M548 Pack
- NSN 1310-01-354-8745- PA 120 US Army Pack
- NSN 1310-01-362-5295- PA 120 US Marine Corps Pack

Complete round:

Type	HEDP
Weight	0.75 lb (340 g)
Length	4.415 in.
Weapons used with	MK19 Mod 1 and Mod 3 40mm Grenade Machine Gun

Projectile:

Body material	Blanked and drawn steel
Color	Olive drab w/yellow markings and yellow ogive
Filler and wieght	Comp A5, 38 g (32 g - M430A1)
Faze	PIBD, M549

Propelling charge:

Cartridge case	M169
Propellant	M2, 4.2 g
Primer	Percussion, FED 215

Performance:

Maximum range	2,200 m
Muzzle velocity	241 mps (790 fps)
Arming distance	18 to 40 m (59 -131 ft)

Temperature Limits:

Firing:

Lower limit	-65°F (-53.8°C)
Upper limit	+125°F (+52.0°C)

Storage:

Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (+73.9°C)

U.S. Army Pack:

*Packing	50 rounds in linked belt

*Packing box:

Weight	53 lb
Dimensions	26-3/8 x 16-1/4 x 6-3/16 in.
cube	1.5 cu ft
Packing drawing number	9251995
Packing, PA 120	32 rounds in linked belt

Packing Box:

Weight	42 lb
Dimensions	18.76 x 10.39 x 6.36 in.
Cube	0.72 cu ft
Packing drawing number	12928042
PA -120 metal container	12564414

U.S. Marine Corps Pack:

*Packing	48 rounds in linked belt

*Packing box:

Weight	59.5 lb
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in.
Cube	1.3 cu ft
Packing drawing number	9362543
M548 metal container	7258943

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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***Shipping and Storage Data:**

UNO serial number	0006
Hazard class/division and storage comparability group	(04) 1.1E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B542

Cartridge drawing number M430	9287851
M430A1 cartridge drawing number	12926811

*NOTE: See DOD Consolidated Ammunition Catalog for additional data.

References:

SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1010-230-10
TM 9-1010-230-23&P

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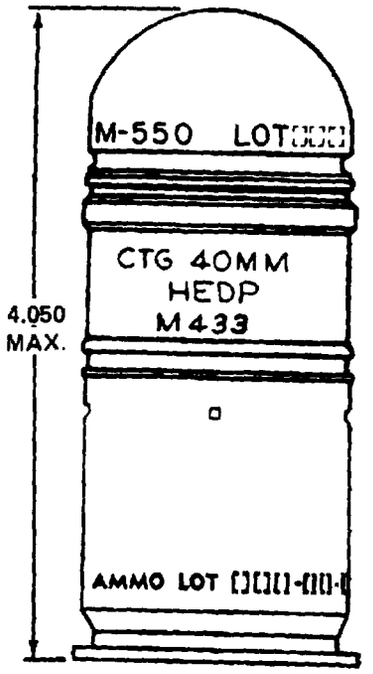
CARTRIDGE, 40-MILLIMETER: HEDP, M433



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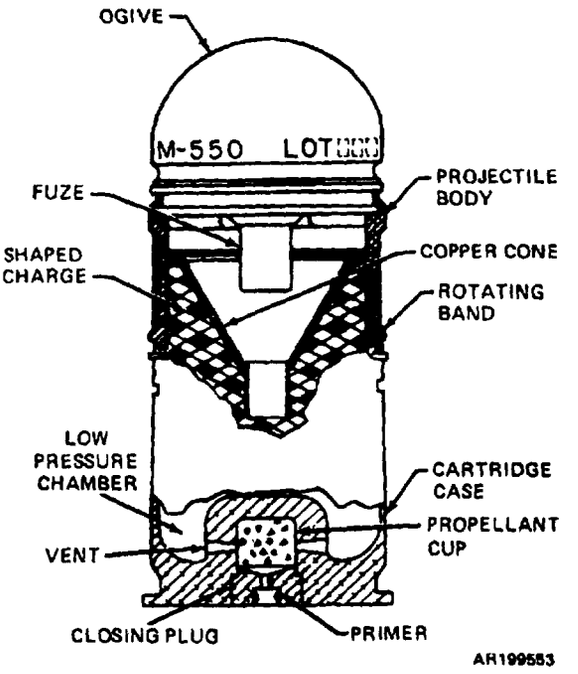

AR199553

Type Classification:

Std AMCTC 8306 dtd 1971

Use:

This cartridge is a dual purpose impact type round which is designed to penetrate at least two inches of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a one-piece, aluminum projectile body with rotating band, and a cartridge case assembly. A hollow aluminum ogive is fitted to the front end of the projectile. A PIBD fuze assembly with an RDX spit-back charge and copper cone liner is fitted to the opening of the projectile cavity. The cavity is sealed by the fuze assembly and contains the high explosive shaped charge. The projectile assembly is press-fitted into the cartridge case assembly. The case is a hollow bichambered aluminum cylinder with a steel closing plug crimped into the opening of the annealed brass propellant cup assembly in the cartridge base. The propellant cup has vent holes in the sides, is sealed in the bottom by the closing plug, and contains the propelling charge. A percussion primer is crimped into the center of the closing plug. The propellant cup acts as a high-pressure chamber, and the upper hollow cavity in the case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer, which ignites the propelling charge. Pressure created by the burning propellant in the high-pressure chamber causes the propellant cup to rupture. The propellant gases escape through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube to impart a spin of 3750 rpm to the projectile. Expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. After the projectile leaves the launcher tube, initial rotation causes the fuze detent to free the fuze rotor. Centrifugal force causes three hammer weights to move radially outward, allowing a conical spring to move the firing pin forward, disengaging the rotor. Dynamic imbalance of the rotor causes it to rotate to the armed position, aligning the M55 detonator with the firing pin and the spitback shaped charge. A fuze escapement mechanism retards rotor movement, delaying arming until

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the projectile has traveled at least 45 feet from the launcher tube. Upon impact with the target, the firing pin is driven into the detonator, triggering the spit-back shaped charge and producing a jet blast which detonates the HE bursting charge. Detonation of the bursting charge forms an armor-piercing jet of molten metal and fragmentation of the projectile body.

Tabulated Data:

Complete round:	
Type	HEAP
Weight	0.507 lb
Length	4.05 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt with steel cup attached
Color	Olive drab w/white markings and yellow ogive
Filler and weight	Comp A5, 45 g
Faze	PIBD, M550
Propelling charge:	
Cartridge case	M118
Propelling charge	M9, 330 mg
Primer	M42, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)
Arming distance	14 to 27 m (45 -90 ft)

Temperature Limits:

Firing:	
Lower limit	-45°F(-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit-	+165°F (73.9°C)
*Packing	6 rounds in bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box	
Weight	53.5 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Storage and Shipping Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	(04) 1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B546
Cartridge drawing number	8886371
Packing drawing number	8835104, 8835105

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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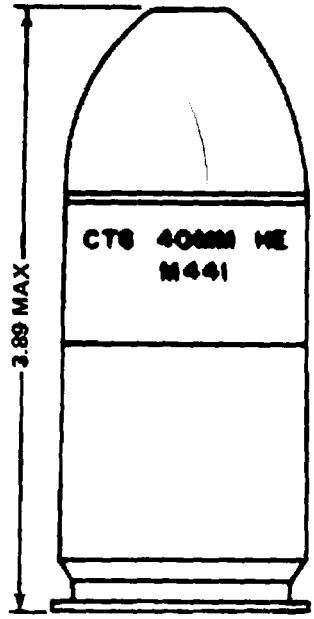
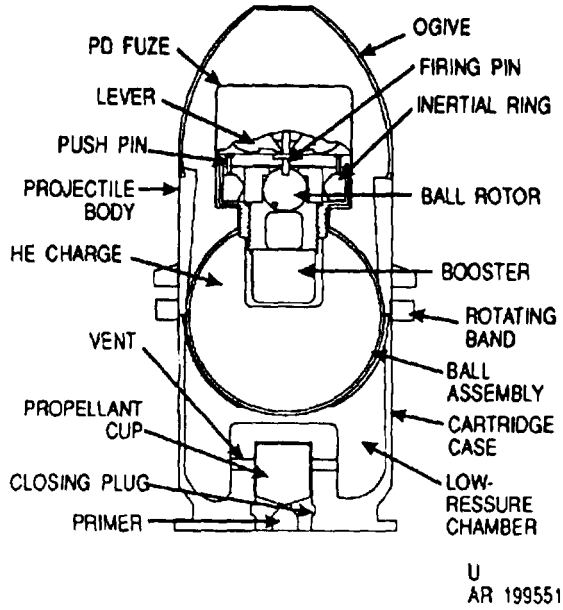
CARTRIDGE, 40-MILLIMETER: HE, M441





AR199552

Type Classification:

Con MSR 11756003

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using ground burst effect. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile body with a rotating band and a cartridge case assembly. A hollow aluminum ogive is fitted to the front of the projectile. A PD fuze with a booster charge is threaded into the opening of a steel ball assembly crimped into the projectile base. The ball assembly contains an HE bursting charge. The projectile assembly is press-fitted into the aluminum cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the cartridge case. The propellant cup assembly is sealed by the closing plug in the bottom, and contains the propelling charge. A percussion primer is crimped into a center opening in the closing plug. The propellant cup assembly acts as a high-pressure chamber, and the hollow cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure ruptures the propellant cup, forcing the gases to escape through the vents into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting spin to the projectile. Expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. At the time of firing, setback causes the firing pin to be withdrawn from the fuze rotor detent. Prior to this action, the detonator in the rotor is held out of line with the explosive train. With the rotor free, centrifugal force causes the rotor ball to turn and aline the detonator with the firing pin. The fuze arms after the projectile has traveled approximately 2 to 4 meters (8 feet) from the launcher tube. Upon graze or impact, inertia throws the inertial ring forward against the push pins. The push pins pivot the levers inward to drive the firing pin into the detonator. The detonator initiates the booster to detonate the high explosive charge resulting in blast and fragmentation of the projectile body.

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Tabulated Data:

Complete round:	
Type	HE
Weight	0.503 lb
Length	3.89 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Aluminum skirt with steel ball containing explosive filler
Color	Olive drab w/yellow markings and yellow ogive
Filler and weight	CompB, 32g
Faze	PD, M552
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	Percussion, M42
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.°C)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds per bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box:	
Weight	53 lb
Dimensions	17-3/4 x 14-1/8 x 11-15/32 in,
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition catalog for complete packing data including NSN's.

Storage and Shipping Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2 E
DOT class	Class A Explosive
DOT marking	AMMUNITIONFOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B575
Cartridge drawing number	9884459
Packing drawing number	8835105

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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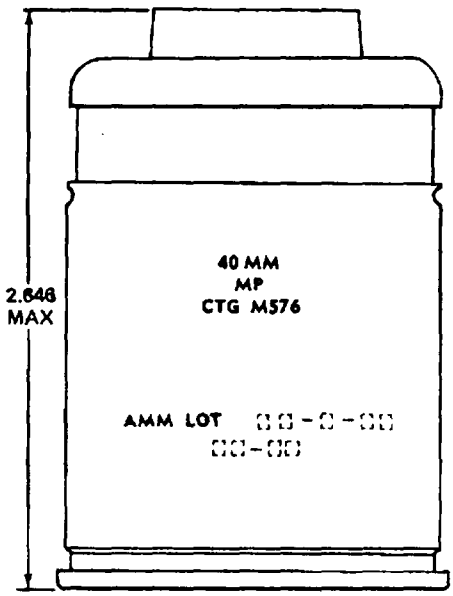
CARTRIDGE, 40-MILLIMETER: MULTIPLE PROJECTILE, M576



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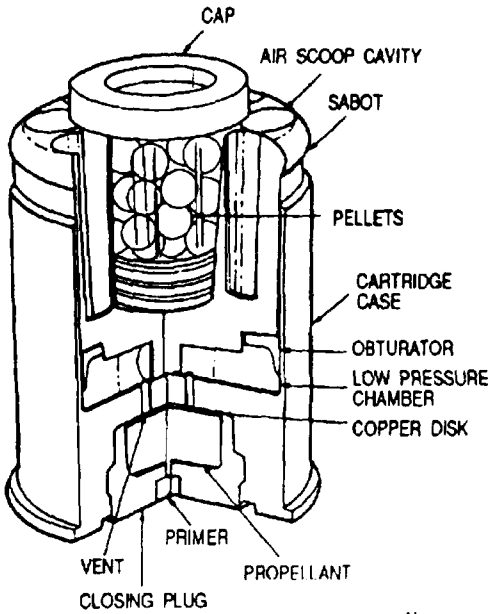

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AR 4949

Type Classification:

Con MSR 11756003

This cartridge is intended for use in counter-insurgency and conventional operations in jungle environments, particularly during periods of poor visibility where personnel targets appear at short distances without warning and are vulnerably exposed only fleetingly. It is designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a multiple projectile assembly and a cartridge case assembly. The projectile assembly includes a polyethylene sabot carrier with one center cavity and several smaller cavities around the outside perimeter, A plastic pellet cup filled with 20 metal pellets is fitted into the center cavity and is covered by a snap on cap. The outer cavities act as air scoops. An obturator on the rear of the sabot serves as a propellant gas seal between the cartridge case and the sabot.

The projectile assembly is crimped into the cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the open well of the propellant chamber in the cartridge base. The propellant chamber acts as a high-pressure chamber and has ten vent holes in the top sealed by a copper disk. The upper hollow cavity in the case serves as a low-pressure chamber. A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer which ignites the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. The pressure ruptures the copper disk allowing the expanding gases to escape through the vent holes into the low-pressure chamber. Continuing gas expansion forces the projectile through the launcher tube. Setback force from cartridge ignition causes the pellet cup in the sabot carrier to move rearward, This movement disengages the cap from the pellet cup. Upon reaching the muzzle, the sabot carrier and pellet cup are discarded allowing the metal pellets free flight to the target.

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Tabulated Data:

Complete round:
- Type ---------- Multiple projectile
- Weight ---------- 0.254 lb
- Length ---------- 2.646 in.
- Cannon used with ---------- M79, M203, 40mm grenade launchers (attached to M16 series rifle)

Projectile:
- Body material ---------- Molded polyethylene plastic
- Color ---------- black w/white markings
- Filler and weight ---------- 20 metal pellets, 24g

Propelling charge:
- Cartridge case ---------- M199
- Propellant ---------- M2, 186 mg
- Primer ---------- Percussion, 0.45 cal, Remington, No. 2-1/2

Performance:
- Effective range ---------- 30 m
- Muzzle velocity ---------- 269 mps (885 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -45°F (-42.8°C)
- Upper limit ---------- +125°F (51.8°C)

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- +165°F (73.9°C)

*Packing ---------- 6 rounds per bandoleer; 12 bandoleers (72 rounds) per wirebound wooden box

*Packing Box:
- Weight ---------- 34 lb
- Dimensions ---------- 16-1/4 x 13-1/4 x 10-11/16 in.
- cube ---------- l.3 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Storage and Shipping Data:

UNO serial number ---------- 0012
Hazard class/division and storage compatibility group-- 1.4 S
DOT class ---------- Class C Explosive
DOT marking ---------- SMALL ARMS AMMUNITION
DODAC ---------- 1310-B534
Cartridge drawing number ------ 10542398
Packing drawing number -------- 8835105

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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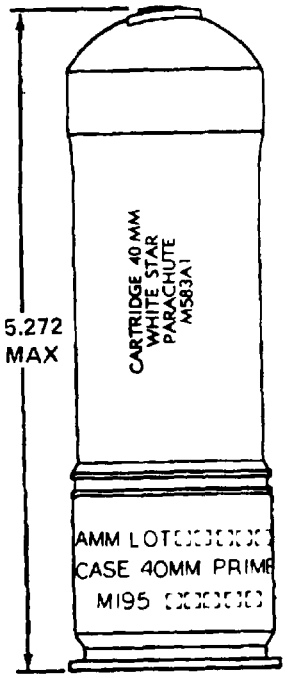
CARTRIDGE, 40-MILLIMETER: PARACHUTE, WHITE STAR, M583A1; GREEN STAR, M661; AND RED STAR, M662



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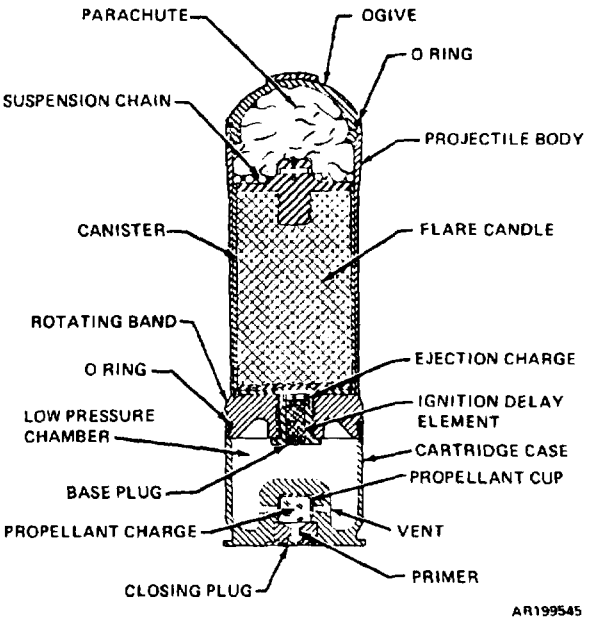

Type Classification:

M583A1-Std LCC-A, AMCTC, 9096 dtd 1972
M661-Std LCC-A, MSR 09766018
M662-Std LCC-A, MSR 09766018

Use:

These cartridges are designed for illumination and signaling with less weight and bulk and greater accuracy than comparable hand-held signals. They are fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a one-piece, hollow aluminum body with a metal rotating band. A plastic ogive, embossed with a raised letter for night identification of payload, is snapped into an O-ring in the front opening of the projectile cavity. The cavity contains a pyrotechnic flare candle assembly, and an integral ignition/ejection charge attached to a 20-inch diameter parachute. The projectile has a 4- to 5-second delay ignition element crimped into the center opening of a metal delay carrier. The projectile is press-fitted into an O-ring in the front opening of the cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed on the bottom by the closing plug. The cup acts as a high-pressure chamber, and the cavity in the case surrounding the cup acts as a low-pressure chamber. A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure ruptures the propellant cup, and the pressure escapes through the vent holes into the low-pressure chamber, propelling the projectile forward with the velocity required to reach the burst altitude. The burning propellant also ignites the .5-second delay element in the base of the projectile. The rotating band engages the rifling in the launcher tube to impart a spin of 3750 rpm to the projectile. At the end of the delay, the delay element ignites the ejection charge. The ejection charge ignites the candle and blows the candle assembly out through the top of the projectile body. The attached parachute deploys upon ejection to

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lower the candle at 7 feet per second. The candle burns for approximately 40 seconds. The candle functions at an altitude of 500 to 700 feet when fired vertically and is visible to an air observer at a slant range of at least 3 miles from 3000 feet altitude.

Tabulated Data

Complete round:	
Type	Parachute, white, green, rod star
Weight	0.49 lb
Length	5.272 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Impact or bar alloy aluminum
Color	White w/black markings
Filler and weight	Illum comp: M583A1 -93 g M661 -86 g M662 -85 g
Average candlepower (rein):	M583A1 - 90,000 M661 .8,000 M662 -20,000
Propelling charge:	
Cartridge case	M195
Propellant	M9, 330 mg
Primer	Perc., M42
Performance:	
Burst height	183 m, (QE=85°) (approx)
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F (-42.8°C)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65° (-53.8°C)
Upper limit	+165°F (73.9°C)
Packing	22 rounds per metal box; 2 metal boxes (44 rounds) per wirebound wooden box
*Packing Box:	
Weight	**45, 9** lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0312
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	SIGNAL FLARES, HANDLE CARFULLY -KEEP FIRE AWAY
DODAC	131 0-B535 (M583A1) 131 0-B504 (M661) 131 0-B505 (M662)
Cartridge drawing number	9243881
Packing drawing numbers	9209204, 9209205

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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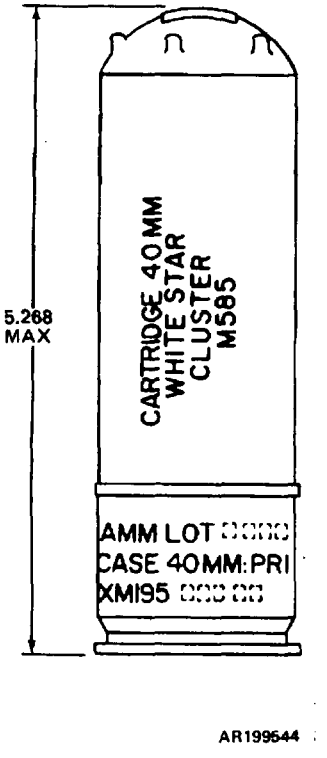
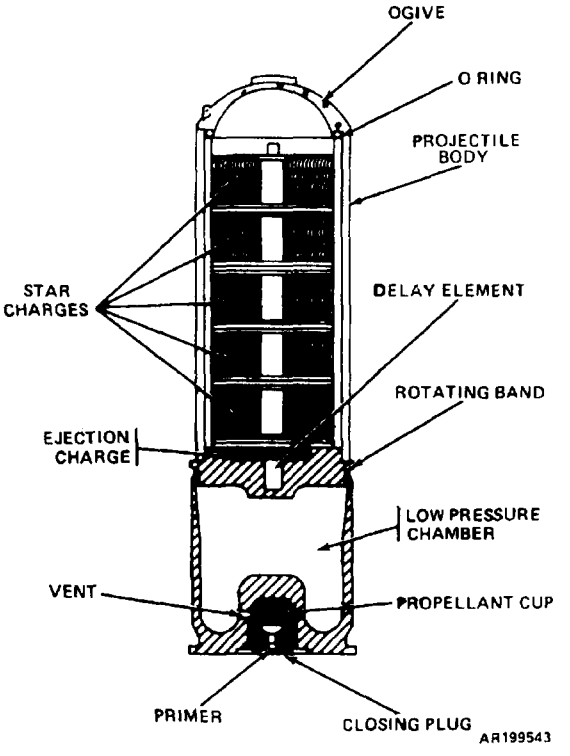
CARTRIDGE, 40-MILLIMETER: CLUSTER, WHITE STAR, M585





Type Classification:

Con MSR 11756003

Use:

The cartridge is designed for illumination and signaling with less weight and bulk and greater accuracy than comparable hand-held signals. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a one-piece, hollow aluminum body with a rotating band. A plastic ogive, embossed with a raised "W" for night identification of payload color and five raised dots to identify a cluster round, is snapped into an O-ring in the front opening of the projectile cavity. The cavity contains an illuminant candle assembly of five white star charges and a black powder ejection charge. The star charges are contained in phenolic-coated Kraft paper and mounted on a base plug of similar material over the ejection charge. A 5-second delay pyrotechnic ignition charge is fitted into the center of the projectile base.

The projectile assembly is fitted into the cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed at the bottom by the closing plug. The cup acts as a high-pressure chamber, and the cavity surrounding the cup in the cartridge case acts as a low-pressure chamber. A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. The pressure ruptures the propellant cup and the gas pressure escapes through the vents into the low-pressure chamber. The expanding gases propel the projectile through the launcher tube with a muzzle velocity of 76 mps and reaches a burst altitude of 550 feet at a quadrant elevation of 85 degrees. The burning propellant also ignites the delay element in the base of the projectile. Within 4 to 5 seconds after firing, the delay element ignites the ejection charge. The ejection charge ignites the star charges and blows the candle assembly out through the top of the projectile body. The individual stars burn for approximately 7 seconds during free fall and produce 55,000 candlepower.

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Tabulated Data:

Complete round:
- Type ---------- Cluster, white star
- Weight ---------- 0.41 lb
- Length ---------- 5.268 in,
- Weapons used with ---------- M79, M203 40-mm grenade launchers (attached to M16 series rifle)

Projectile:
- Body material ---------- Impact or bar aluminum
- Color ---------- White w/black markings
- Filler and weight ---------- Illum, 85 g (each pellet 17g)

Propelling charge:
- Cartridge case ---------- M195
- Propellant ---------- M9, 330 mg
- Primer ---------- percussion, M42

Performance:
- Burst height ---------- 167 m (QE=85°) (approx)
- Muzzle velocity ---------- 76 mps (250 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -45°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -65°F
- Upper limit ---------- +165°F

*Packing ---------- 22 rounds per metal box; 2 metal boxes (44 rounds) per wirebound wooden box

*Packing Box:
- Weight ---------- 45.9 lb
- Dimensions ---------- 14-5/8x 12-13/16x 9-1/8 in,
- Cube ---------- l.0 $_{cu}$ ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ----------	0312
Hazard class/division and storage compatibility group --	1.4G
DOT class ----------	Class C Explosive
DOT marking ----------	SIGNAL FLARES, HANDLE CAREFULLY -KEEP FIRE AWAY
DODAC ----------	1310-B536
Drawing number ----------	9207987
Packing drawing numbers ------	9209204 9209205

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251.20
TM 9-1300-251-34

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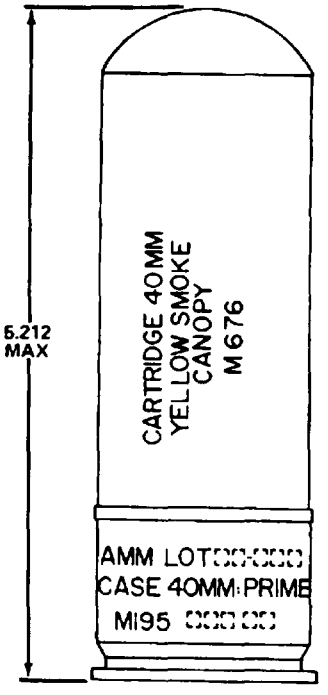
CARTRIDGE 40-MILLIMETER: CANOPY YELLOW SMOKE, M676



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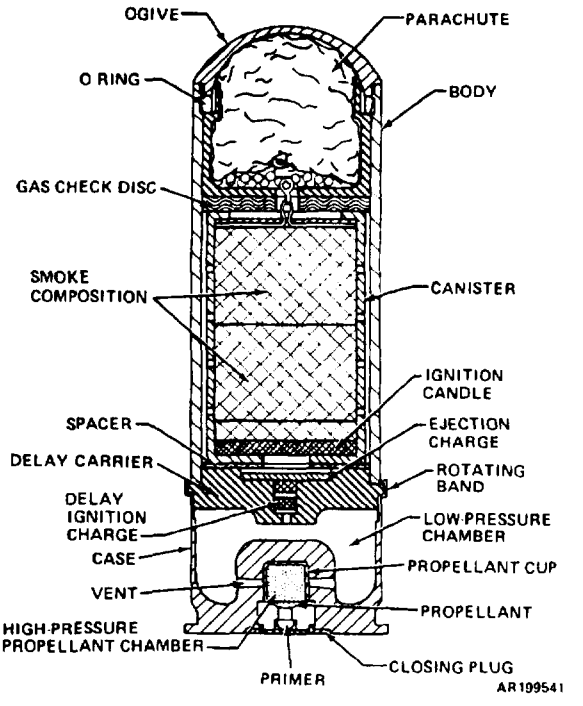

Type Classification:

Std LCC-A, MSR 09766018

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. The cartridge has the advantage of less weight and bulk and greater accuracy than comparable existing signals. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly The projectile is a hollow, one-piece aluminum body with a rotating band. A plastic ogive is snapped into an O-ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic ignition candle and an aluminum canister containing yellow smoke composition attached to a rotating "X" type parachute. A 2-second ignition delay element is crimped into the center of the metal delay carrier. The delay carrier is threaded into the projectile base. A cavity about the delay element contains an ejection charge pellet consisting of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection charge in the projectile cavity. The projectile assembly is press-fitted into an O-ring in the cartridge case opening. The case is a hollow aluminum bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug. A percussion primer is fitted into the center of the closing plug. The cup acts as a high-pressure chamber, and the cavity around the cup in the cartridge case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture, forcing the gases to escape through the vent holes into the low-pressure chamber to propel the projectile through the launcher barrel with a muzzle velocity of 76 mps and reaches a burst altitude of 300 feet at a quadrant elevation of 85 degrees. Concurrently, the propellant gases ignite a 2-second delay element in the base of the projectile. The rotating band engages the rifling in the launcher barrel to impart a spin of 3750 rpm to the projectile. Approximately two seconds after firing, the delay element ignites the ejection

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charge. The ejection charge ejects the smoke canister and parachute assembly out the top of the projectile body and simultaneously ignites the smoke candle. The parachute deploys upon ejection. The smoke canister descends emitting a 90-second smoke signal and becomes entangled in the dense foliage by means of the "X" type parachute.

Tabulated Data:

Complete round:	
Type	Canopy yellow smoke
Weight	0.48 lb
Length	5.212 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Impact or bar aluminum alloy
Color	Light green w/black markings
Filler and weight	Yellow smoke composition 59 g
Propelling charge:	
Cartridge case	M195
Propellant	M9, 330 mg
Primer	Perc., M42
Performance:	
Burst height	91 m (QE=85°) (approx)
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F
Upper limit	+125°F
Storage:	
Lower limit	-65°F
Upper limit	+165°F
*Packing	22 rounds per metal box; 2 metal boxes (44 rounds) per wirebound wooden box
*Packing Box:	
Weight	45.9 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Storage and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	class c Explosive
DOT marking	SMOKE SIGNALS, HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	1310-B475
Drawing number	9229370
Packing drawing number	9209204, 9209205

Reference:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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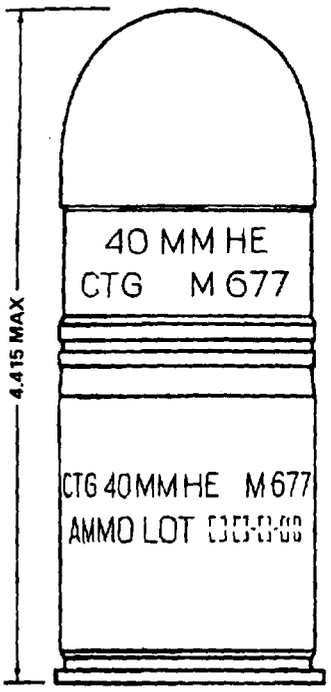
CARTRIDGE, 40-MILLIMETER: HE-1; M677



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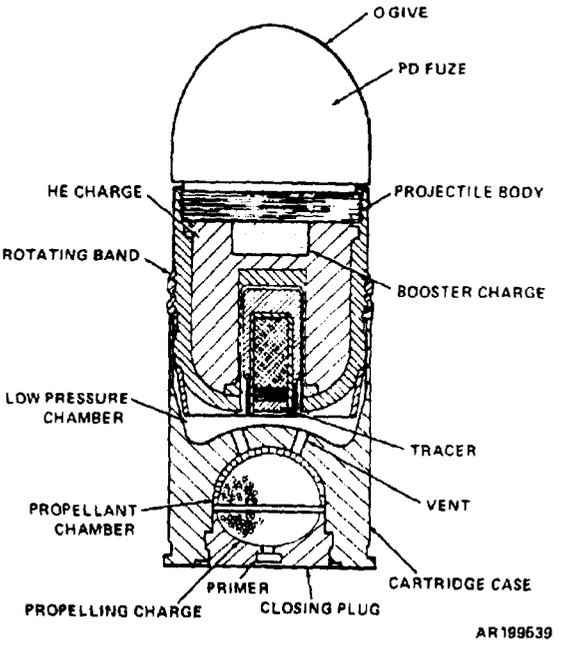

AR199539

Type Classification:

Not type classified

Used:

This cartridge is a high explosive round containing a tracer element for flight tracking purposes designed to inflict personnel casualties in the target area from ground burst effect. It is fired from 40mm Grenade Launchers M75 and M129, and from 40mm Machine Gun MK19 Mod 1.

Description:

This cartridge is a fixed round of ammunition consisting of an internally embossed one-piece steel projectile body with a mental rotating band, and a cartridge case assembly containing a propelling charge and a percussion primer. A PD fuze is threaded into the front end of the projectile. The projectile cavity contains a high explosive bursting charge and an RDX booster pellet seated below the fuze. A tracer element is threaded into the opening in the center of the projectile base. The projectile assembly is press-fitted into a cartridge case, The case is an aluminum bichambered cylinder with a metal closing plug crimped into the open well of the propellant chamber in the base. The propelling charge is contained in the spherical high-pressure propellant chamber. The chamber has vents in the top and is sealed in the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure forces the gases through the vents into the low-pressure chamber and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube, imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber ignite the tracer element and force the projectile through the tube with a velocity of 244 meters per second. When the projectile is fired, setback forces cause the fuze setback pin, which keeps the fuze rotor out of alignment with fuze detonator, to be pulled out of the rotor. The rotor is secured in position by a fuze centrifugal lock which engages the star wheel in the fuze timing mechanism. The centrifugal lock releases the star wheel and arming of the projectile begins when the projectile attains sufficient spin. The rotor springs start rotation of

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the rotor which is sustained by centrifugal force. The fuze escapement assembly engages the rotor gear delaying arming of the fuze for approximately 0.07 to 0.16 seconds. The rotor is then locked in the armed position, and the fuze is armed approximately 18 to 36 meters from the launcher. The tracer element provides flight trace and burns for approximately ten seconds after ignition. Upon impact or graze with the target, inertial forces from impact cause the fuze bracket weights to pivot inward and force the fuze firing pin into the detonator. Concurrently the detonator triggers the booster charge, in turn, detonating the bursting charge and causing a blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:	
Type	HE-T
Weight	0.75 lb
Length	4.415 in.
Cannon used with	M75, M129 40mm Grenade Launchers MK19 Mod 1 40mm machine gun
Projectile:	
Body material	Plate steel
Color	Olive drab w/yellow markings and yellow ogive
Filler and weight	Cyclotol 70/30, 45 g
Fuze	PD, M533
Propelling charge:	
Cartridge cafe	M169
Propellant	M2, 4.64 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)

Temperature Limits:

Firing:	
Lower limit	- 45°F
Upper limit	+ 125°F
Storage:	
Lower limit	- 65°F
Upper limit	+ 165°F
*Packing	50 rounds in linked belt
*Packing Box:	
Weight	53 lb
Dimensions	25-11/16 x 16-1/4 x 6-27/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data in- eluding NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC:	
M383 and M677 linked 3 to 1	1310-B529
M384 and M677 linked 3 to 1	1310-B527
Drawing number	9234424
Packing drawing number	9251995

References:

SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

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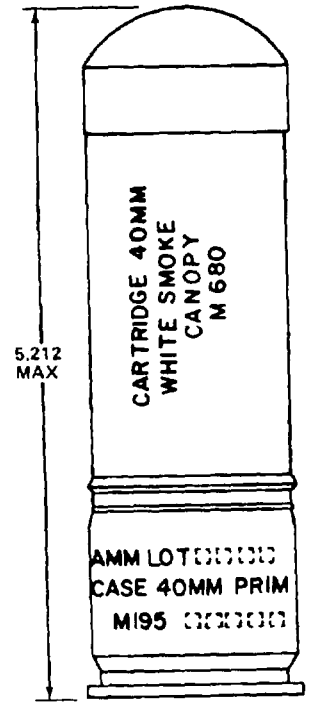
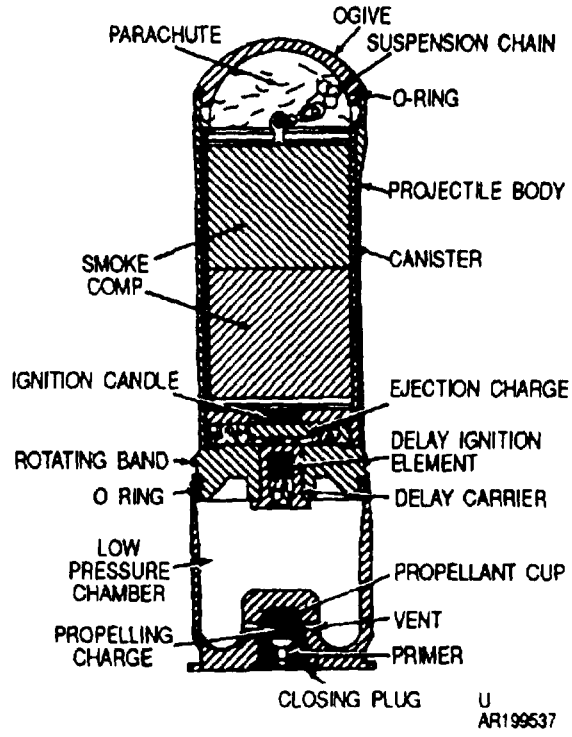
CARTRIDGE, 40-MILLIMETER: CANOPY WHITE SMOKE, M680





Type Classification:

Std LCC-A, MSR 09766018

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. This cartridge has the advantage of less weight and bulk and greater accuracy over comparable existing signals. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile body is a hollow one-piece aluminum body with a metal rotating band. A plastic ogive is snapped into an O-ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic ignition candle and an aluminum canister containing white smoke composition attached to a rotating "X" type parachute. A 2-second delay ignition element is crimped into the center of the metal delay carrier. The carrier is threaded into the projectile base. A cavity above the delay element contains an ejection charge pellet which consists of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection charge in the projectile cavity. The projectile assembly is press-fitted into the O-ring in the cartridge case opening. The case is a hollow aluminum bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug. A percussion primer is crimped into the center opening of the closing plug. The cup assembly acts as a high-pressure chamber and the cavity in the case which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture forcing the gases to escape through the vent holes into the low-pressure chamber and propels the projectile through the launcher barrel. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 3750 rpm to the projectile. The expanding gases

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in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 76 mps and reaches a maximum burst height of 300 feet at quadrant elevation of 85 degrees. Concurrently the propellant gases ignite the 2-second delay element in the base of the projectile. Approximately two seconds after ignition, the delay element ignites the ejection charge and ignition candle. The ignition candle ignites the white smoke composition in the smoke canister. The ejection charge ejects the smoke canister and parachute out the front end of the projectile. The parachute deploys upon ejection. The smoke canister descends, emitting a 90-second smoke signal and becomes entangled in the dense foliage by means of the" X" type parachute.

Tabulated data:

Complete round:	
Type	Canopy white smoke
Weight	0.48 lb
Length	5.212 in.
Weapons used with	M79, M203, 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Impact or bar aluminum alloy
Color	Light green w/black markings
Filler and weight	White smoke composition, 59 g
Propelling charge:	
Cartridge case	M195
Propellant	M9, 330 mg
Primer	Percussion, M42
Performance:	
Burst height	91 m (QE=85°) (approx)
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F
Upper limit	+125°F
Storage:	
Lower limit	-65°F
Upper limit	+165°F
*Packing	22 rounds per metal box; 2 metal boxes (44 rounds) per wooden box
*Packing Box:	
Weight	45.9 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data in- eluding NSN'S.

Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	SMOKE SIGNALS HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	1310-B477
Drawing number	9235365
Packing drawing numbers	9209204, 9209205

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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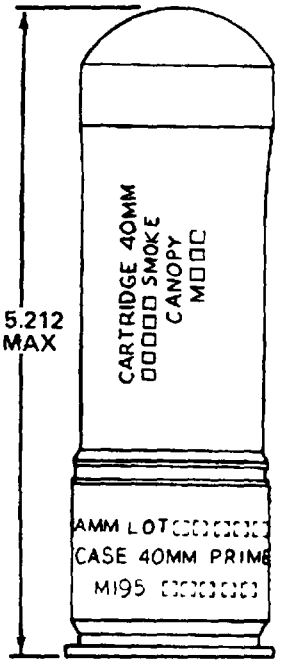
CARTRIDGE 40- MILLIMETER: CANOPY RED SMOKE M682



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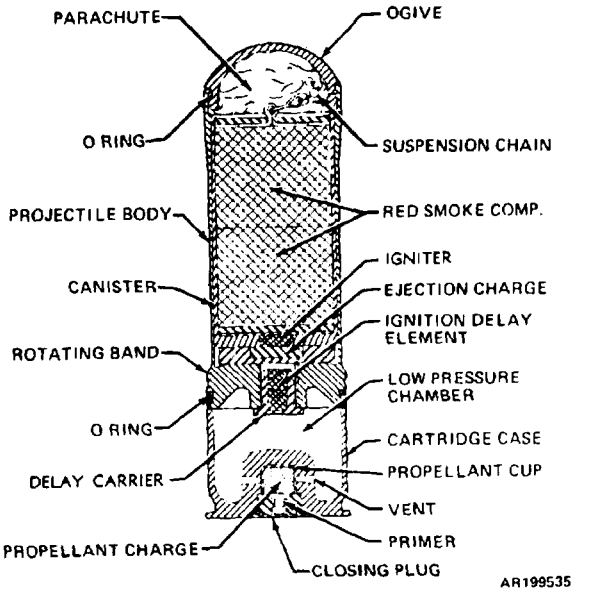

Type Classification:

Std LCC-A, MSR 09766018

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. This cartridge has the advantage of less weight and bulk and greater accuracy over comparable existing signals. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly The projectile body is a hollow one-piece aluminum body with a metal rotating band. A plastic snap-on ogive is snapped into the O-ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic igniter and an aluminum canister containing red smoke composition attached to a rotating "X" type parachute. A 2-second delay ignition element is crimped into the center of a metal delay carrier (base plug). The delay carrier is threaded into the projectile base. The ejection disk above the delay element contains an ejection charge pellet which consists of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection disk in the projectile cavity The projectile assembly is press-fitted into the O-ring in the cartridge case opening. The case is a hollow aluminum bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug and contains the propelling charge. A percussion primer is crimped into the center opening of the closing plug. The cup assembly acts as a high-pressure chamber and the cavity in the base which surrounds the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture forcing the gases through the side vents into the low-pressure chamber and propels the projectile through the launcher barrel. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 3750 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 76 raps and reaches a maximum burst height of

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300 feet at a quadrant elevation of 85 degrees. Concurrently the propellant gases ignite the 2-second delay element in the base of the projectile. Approximately two seconds after ignition, the delay element ignites the ejection charge and igniter. The igniter ignites the red smoke composition in the smoke canister. The ejection charge ejects the smoke canister and parachute out of the front end of the projectile. The parachute deploys upon ejection. The smoke canister descends emitting a 90-second smoke signal and becomes entangled in the dense foilage by means of the "X" parachute.

Tabulated Data:

Complete round:	
Type	Canopy red smoke
Weight	0.48 lb
Length	5.212 in.
Weapons used with	M79 M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Impact or bar aluminum alloy
Color	Light green w/black markings
Filler and weight	Red smoke composition, 80 g
Propelling charge:	
Cartridge case	M195
Propellant	M9 330 mg
Primer	Perc., M42
Performance:	
Burst height	91 m (QE=85°) (approx)
Muzzle velocity	76 mps (250 fps)

Temperature Limits:

Firing:	
Lower limit	-45°F
Upper limit	+125°F
Storage:	
Lower limit	-65°F
Upper limit	+165°F
*Packing:	22 rounds per metal boxes; 2 metal boxes (44 rounds) per wirebound wooden box
*Packing Box:	
Weight	45.9 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	SMOKE SIGNALS HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	1310-B479
Drawing number	9235963
Packing drawing numbers	9209204 9209205

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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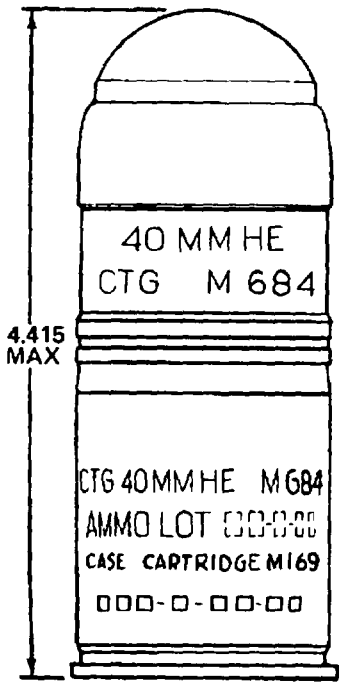
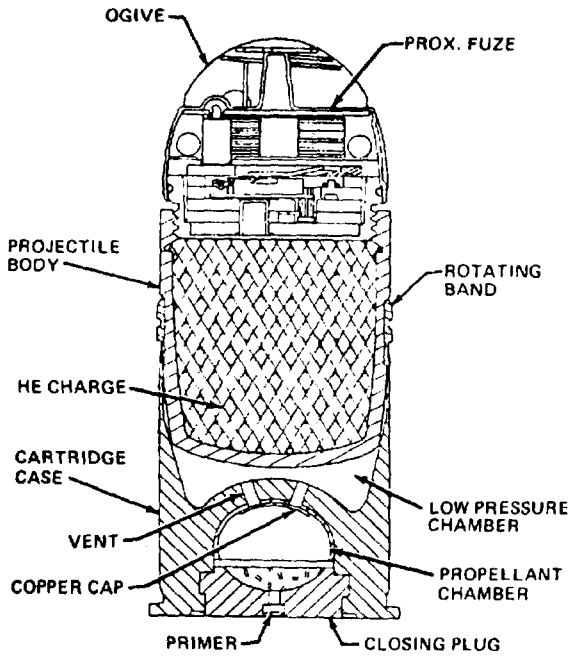
CARTRIDGE, 40-MILLIMETER: HE M684



AR199534



AR199533

Type Classification:

CONT MSR 03736153 dtd 1973

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from air burst effect. It is fired from M75 and M129 grenade launchers and is issued completely assembled in linked belts of 50 rounds.

Description:

This cartridge is fixed round of ammunition consisting of a one-piece internally embossed steel body with a metal rotating band and a cartridge case containing the propelling charge and percussion primer. The projectile cavity contains a Composition A5 bursting charge. An electric proximity fuze is threaded into -the front opening of the projectile. The fuze assembly includes all solid-state circuitry, liquid reserve power supply electronic detonator, mechanical safety arming mechanism, and an independent mechanical impact element. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug crimped into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high-pressure propellant chamber. This chamber has vent holes in the top and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 meters per second. After the projectile leaves the launcher the fuze arms mechanically at a distance of 18 to 36 meters. Electronic arming occurs at approximately 125 meters from the launcher. Air burst functioning will occur after this distance upon approach to the target. The target reflects the CW transmission of the fuze. The fuze detects the reflected radio wave and discriminates between the reflected wave and other radio signals emanating from normal communications systems or other nearby f'uzes When the proper reflected signal is obtained

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near approach to the target, the firing circuit is energized causing initiation of the electronic detonator. In turn the high explosive bursting charge detonates causing an air burst and projectile fragmentation at an optimum height above the target. The burst height will vary depending upon the ability of the target to reflect radio waves and the angle of approach. In the event the electronic circuit fails or the electronic sensor fails to initiate the explosive train, impact or graze with the target will cause the mechanical fuze to initate the explosive train.

Tabulated Data:

Complete round:	
Type	HE
Weight	0.74 lb
Length	4.415 in.
Weapons used with	M75, M125 40mm grenade launchers
Projectile:	
Body material	Impact steel
Color	Olive drab w/yellow markings and translucent ogive
Filler and weight	Comp A5, 53 g
Fuze	Electronic proximity, M596
Propelling charge:	
Cartridge case	M169
Propellant	M2, 4.64 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)
Arming distance	18 to 36 m (59 -118 feet)

Temperature Limits:

Firing:	
Lower limit	-45°F
Upper limit	+125°F
Storage	
Lower limit	-65°F
Upper limit	+165°F
*Packing	50 rounds per unit in linked belt
*Packing Box:	
Weight	53 lb
Dimensions	25-11/16 x 16-1/4 x 6-27/32 in.
Cube	1.7 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	(12) 1.1 E
Dot class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B573
Cartridge drawing number	9247850
Packing drawing number	9251995

References:

SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

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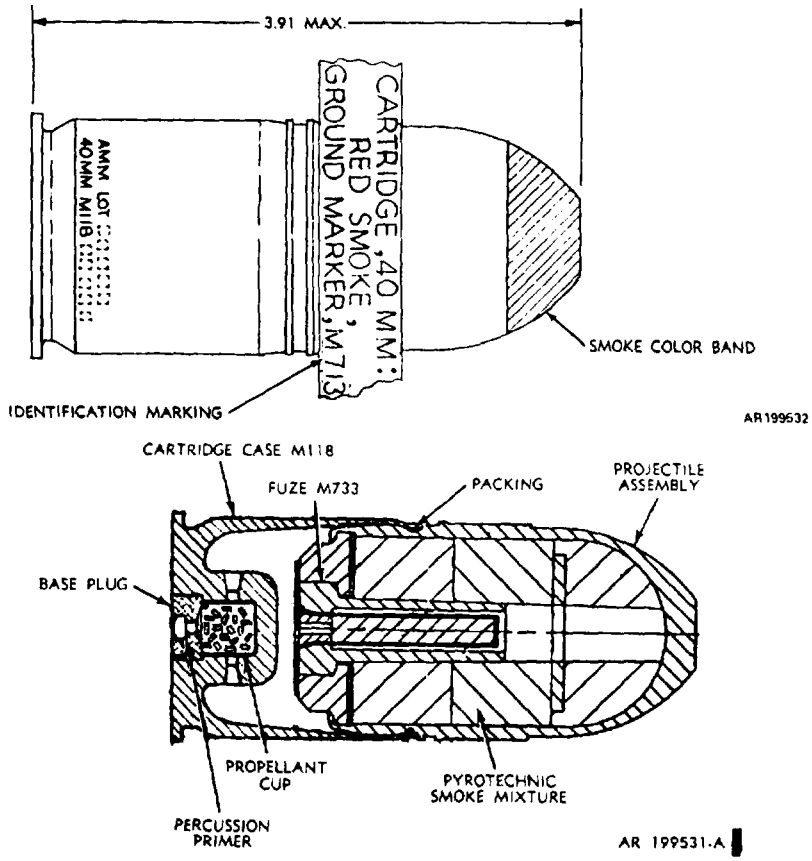
CARTRIDGE, 40-MILLIMETER: GROUND MARKER RED SMOKE M713; GREEN SMOKE, M715; AND YELLOW SMOKE, M716



Tape Classification:

Std LCC-A, MSR 09766018

Use:

These cartridges are used to provide aerial identification and location of troops on the ground and are designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

The cartridges consist of a cartridge case, a Projectile with pyrotechnic smoke payload, and a pyrotechnic impact fuze. The cartridge case is a dual-chambered aluminum container housing a brass propellant cup. The propellant cup is held in the case by a crimped base plug which provides a pressure-type waterproof seal. The base plug houses a percussion primer. The projectiles utilize a one-piece aluminum body-ogive and a steel base. The payload consists of a pyrotechnic smoke mixture pressed into the body-ogive with a cylindrical cavity in the center. The fuze is cemented to the base of the projectile and protrudes into the cylindrical cavity of the smoke mixture. The fuze is designed to arm at a minimum of 15 meters and a maximum of 45 meters from the muzzle of the weapon.

Functioning:

Upon firing the primer ignites the propelling charge. In turn, the projectile is accelerated down the launcher barrel where a spin of 3,750 rpm is imparted by the barrel rifling. A muzzle velocity of approximately 250 fps is attained. In addition to launching the projectile, the propellant gases ignite the first fire mixture of the fuze in the base of the projectile. The first fire mixture ignites a high-temperature transfer mixture contained in the steel cup. The transfer mixture burns during the first 15 meters of projectile flight. When the projectile is between 15 and 45 meters from the launcher muzzle, heat transfer through the steel cup ignites the delay mixture. Upon impact, the delay casing breaks and the burning portion flies forward out of the fuze support, contacting and igniting the pyrotechnic smoke mixture. Ignition of the smoke mixture

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causes a buildup of pressure which dislodges the fuze support at the aft end of the projectile thus allowing smoke to be emitted at the aft end of the projectile. Projectile impact prior to the minimum arming distance (15 meters) results in a dud. Between 15 and 45 meters from the launcher muzzle, the fuze may or may not function on impact. In the event the fuze fails to function upon impact, the output mixture provided in the front end of the delay casing acts as a backup to the impact feature. When the flame reaches this point (8 to 10 seconds after launch) the output mixture flashes and ignites the smoke mixture. The difference among the models is the color of the smoke.

Tabulated Data:

Complete round:	
Type	Ground marker smoke
Weight	0.49 lb
Length	3.91 in.
Weapons used with	M79 M203 40mm grenade launchers (attached to M16 series rifle).
Projectile:	
Body material	Aluminum
Color	Light green w/black markings
Filler and weight	Smoke mixture, 75 g
Fuze	Impact pyrotechnic M733
Propelling charge:	
Cartridge case	M118
Propellant	M9, 330 mg
Primer	Percussion, FED 100
Performance:	
Maximum range	400 m
Muzzle velocity	76 mps (250 fp)

Temperature Limits:

Firing:	
Lower limit	-45°F
Upper limit	+125°F
Storage:	
Lower limit	-65°F
Upper limit	+165°F
*Packing	22 round per metal box; 2 metal boxes per wire-bound wooden box
*Packing Box:	
Weight	45.9 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	l.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	SMOKE SIGNALS, HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	M713-1310-B506 M715-1310-B508 M716-1310-B509
Cartridge drawing number:	
M713	9323251
M715	9323261
M716	9323265
Packing drawing numbers	9209204, 9209205

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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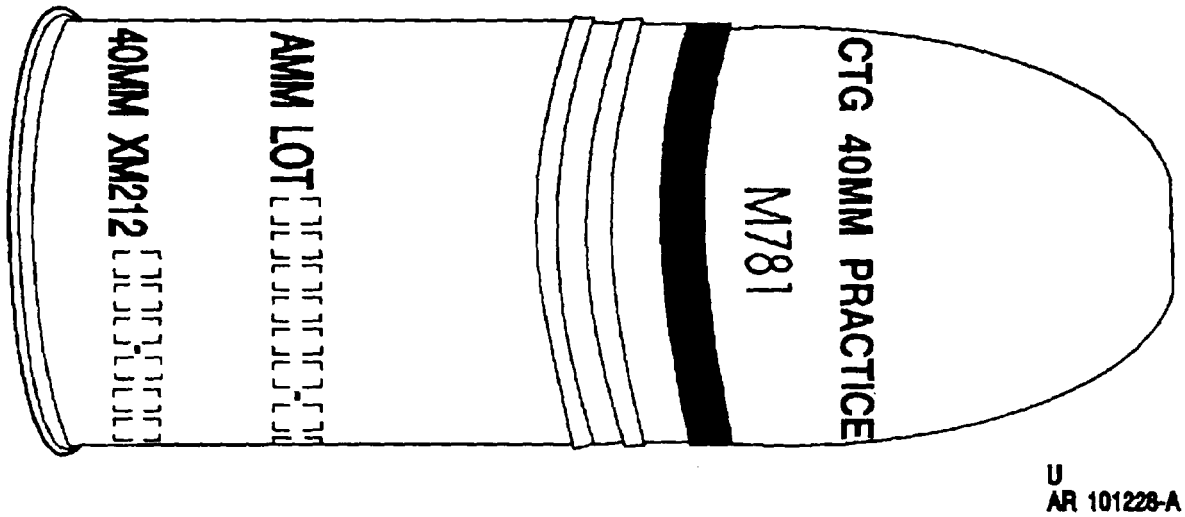
CARTRIDGE, 40-MM: PRACTICE, M781



Type Classification:

Std **LCC-A, MSR 05786002**

Use:

This cartridge is a fixed, practice type ammunition designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a metal projectile body with a rotating band and a cartridge case assembly. A hollow plastic ogive is filled with a high visibility yellow-orange dye. The projectile assembly is attached to a cartridge case with an attached adhesive substance. The case is a hollow bichambered plastic cylinder. A .38 caliber blank cartridge is press-fitted into the base of the cartridge case and provides the gas pressure needed to propel the projectile through the launcher barrel.

Functioning:

The weapon firing pin strikes the .38 caliber blank cartridge primer igniting the propelling charge. The burning propelling charge generates sufficient pressure to release the expanding propellant gases through the vent hole into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a velocity of 76 meters per second. Upon impact with the target, the frangible ogive ruptures and releases the dye causing a puff of yellow-orange smoke which simulates explosive impact.

Tabulated Data:

NSN 1310-01-050-7967- U.S. Army Pack
NSN 1310-01-148-8881- U.S. Army Pack
NSN 1310-01-211-8073- U.S. Army Pack
NSN 1310-01-107-5404- U.S. Marine Corps Pack

Complete round:

Type	Practice
Weight	205 g
Length	4.05
Weapons	Used with M79, M203 (attached to M16 series rifle) 40mm grenade launchers

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Projectile:
- Body material ---------- Zinc or aluminum
- Color ---------- Blue w/white markings
- Filler and weight ---------- Orange dye
- Fuze ---------- None

Propelling charge:
- Cartridge case ---------- M212
- Propellant ---------- M9, 340 mg
- Primer number ---------- 1-1/2 (commercial)

Performance:
- Maximum range ---------- 400 m (437.6 yd)
- Muzzle velocity ---------- 76 mps (250 fps)

Temperature Limits:

Firing:
- Lower limit ---------- -25°F (-31.6°C)
- Upper limit ---------- +110°F (+43.3°C)

Storage:
- Lower limit ---------- -30°F (-34.4°C)
- Upper limits ---------- +145°F (+63°C)

U.S. Army Pack:

NSN 1310-01-148-8881:
- *Packing ---------- 100 rounds per wood box
- *Packing Box:
  - Weight ---------- 64 lb
  - Dimensions ---------- 22-3/4 in. x 11-1/16 in. x 11-5/8 in.
  - Cube ---------- l.7 cu ft
  - Packing drawing number--- 9325896

NSN 1310-01-050-7967:
- *Packing ---------- 75 rounds per wood box
- *Packing Box:
  - Weight ---------- 53.2 lb
  - Dimensions ---------- 22-318 in. x 11-1/16 in. x 11-22/32 in.
  - Packing drawing number--- 9325896

NSN 1310-01-211-8073:
- *Packing ---------- 100 rounds per wirebound Box
- *Packing Box:
  - Dimensions ---------- 22-3/8 in. x 10-13/16 in. x 10-5/8 in.
  - Packing drawing number--- 9325896

U.S. Marine Corps Pack:

NSN 1310-01-107-5404:
- *Packing ---------- 44 rounds per box
- *Packing box:
  - Weight ---------- 45.9 lb
  - Dimensions ---------- 14-5/8 in. x 12-13/16 in. x 9-1/8 in
  - cube ---------- 1.0 cu ft
  - Packing drawing number--- 9209204, 9209205

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data.

Shipping and Storage Data:

UNO serial number ---------- 0339
Hazard class/division and storage compatibility group -- 1.4 C
DOT class ---------- Class C Explosive
DOT marking ---------- CARTRIDGES, PRACTICE AMMUNITION
DODAC ---------- 1310-B519
Cartridge drawing number ------ 9322240

References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

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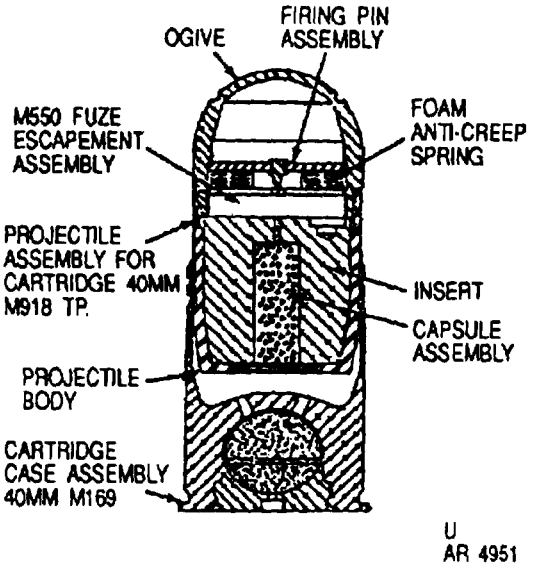
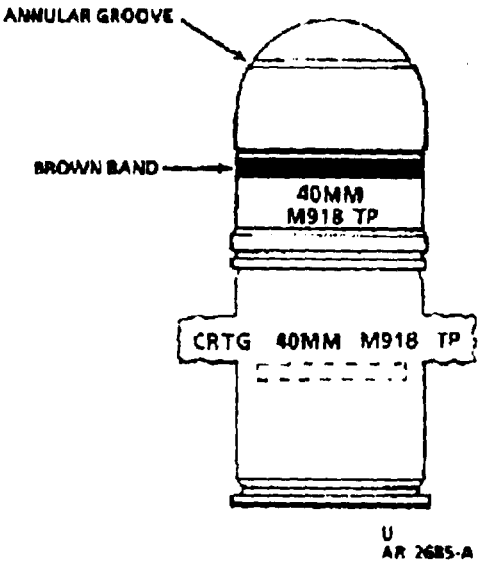
40-MILLIMETER PRACTICE, M918





Type Classification:

Std LCC-A MSR 01866003

Use:

This cartridge is a target practice round designed to simulate the M430 Cartridge in appearance and ballistics. It is fired from the 40mm Grenade Machine Gun MK19 Mod 3. It is also used in the cartridge, subcaliber ammunition, training (CSAT): M970 to simulate the loading and firing of large caliber ammunition.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece steel projectile body which is fitted to a cartridge case assembly An aluminum ogive, which contains a firing pin plate assembly, a cellular foam anti-creep spring, and the standard M550 fuze escapement assembly is threaded to the projectile body An aluminum insert which contains a flash charge chamber is enclosed in the projectile body. A plastic container contains the flash charge chamber which contains one gram of flash charge composition. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with a metal closing plug crimped into the open well of the propellant chamber cartridge base. The propellant in the chamber, which contains the propelling charge, has vent holes in the top and is sealed at the bottom by a closing plug. A percussion primer is crimped into the center opening in the closing plug. The propellant chamber acts as high pressure chamber, and the upper hollow cavity in the case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Pressure, generated by the burning propellant in the high-pressure chamber, forces the expanding gases through the vent holes into the low-pressure chamber and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a velocity of 242 meters per second. When the projectile is fired, setback force causes the fuze setback pin to move rearward from the fuze rotor. The rotor is held out of line with the fuze detonator by the setback pin and fuze centrifugal lock which engages the gear teeth of the fuze rotor. When the projectile attains sufficient spin, the centrifugal lock releases the rotor and arming begins. The rotor begins rotation toward the center of the projectile. The rotor gear engaged with the pinion shaft delays arming of the fuze. After the projectile has traveled 18 to 30 meters from the launcher tube, the rotor is locked in the armed position and the fuze is armed. Upon impact with the target, the entire escapement moves forward compressing the cellular foam spring and driving the detonator into the firing pin, which in turn flashes through the small hole of the insert and ignites the flash powder. Gases generated by the burning powder are concentrated upon the base of the projectile body causing it to rupture and producing a flash, smoke and a loud report.

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Rupture begins at the very center of the projectile base forming hinged petals.

Tabulated Data:

NSN 1310-01-218-7070- U.S. Army Pack
NSN 1310-01-218-7069- U.S. Marine Corps Pack
NSN 1310-01-283-8652- M970 Pack
NSN 1310-01-317-5948- PA-120 Pack

Complete round:

Type	Target practice
Weight	0.76 lb
Length	4.415 in.
Weapons used with	MK19, Mod 3, 40mm grenade machine gun, M970 CSAT

Projectile:

Body material	Blank and draw steel
Color	Blue w/black markings brown band and blue ogive
Filler and weight	Flash charge composition, lg
Fuse	M550 escapement

Propelling charge:

Cartridge case	M169
Propellant	M2, 4.2g
Primer	Percussion, FED 215

Performance:

Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)
Arming distance	18 to 30 m (59 -98 ft)

Temperature Limits:

Firing:

Lower limit	-25°F (-31.7°C)
Upper limit	+110°F (+43.3°C)

Storage:

Lower limit	-30°F
Upper limit	+145°C (+62.8°C)

U.S. Army Pack:

*Packing	50 rounds in linked belt
*Packing Box:	
Weight	53 lb
Dimensions	26-3/8 x 16-1/4 x 6-3/16 in.
Cube	1.5 cu ft
Packing drawing number	9251995
Packing, PA-120	32 rounds in linked belt
Packing Box:	
Weight	42 lb
Dimensions	18.76 x 10.39 x 6.36 in.
Cube	0.72 cu ft
Packing drawing number	12928042
PA-120 metal container	12564414

U.S. Marine Corps Pack:

*Packing	40 rounds in linked belt
*Packing Box:	
Weight	59.5 lb
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in.
Cube	1.3 cu ft
Packing drawing number	9362543

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Hazard class/division and storage compatibility group	(04) 1.4 C
UNO serial number	0338
DOT class	Class C Explosive
DOT marking	CARTRIDGE, PRACTICE AMMUNITION
DODAC	1310-B584
Cartridge drawing number	9399372

References:

SB 700-20
DOD Consolidated Ammunition Catalog
TM 9-1010-230-10
TM 9-1010-230-23&P
TM 9-1300-251-20
TM 9-1300-251-34

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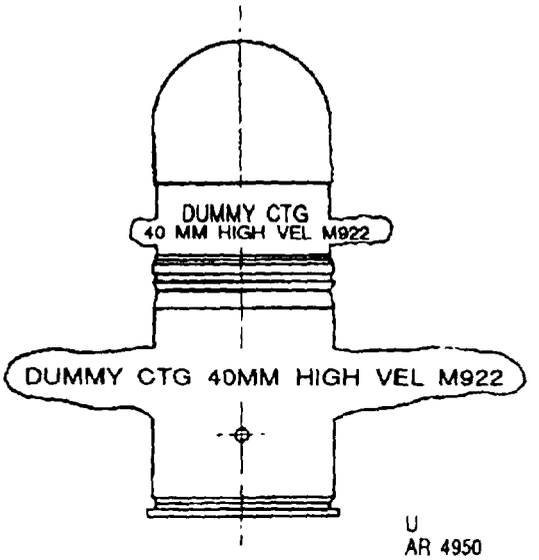
CARTRIDGE, 40-MILLIMETER: DUMMY, M922



Type Classification:

Std LCC-A MSR 0689601524 May 90

Use:

This dummy cartridge is used as a drill round to train users in handling ammunition and loading the MK19 series grenade machine gun and the M129 grenade launcher.

Description:

The cartridge is completely inert and simulates a loaded round of 40mm HE ammunition in size, shape, and weight. This fixed round consists of a one-piece solid aluminum projectile body together with a copper rotating band. The cartridge case is crimped around the projectile body. There are four thru-holes drilled through the cartridge case to the high-pressure chamber for positive identification. The primer hole is filled with RTV sealant. The rotating band and the belt links are modified for repositioning after cycling in an MK19 weapon.

Functioning:

This cartridge is completely inert and nonfunctional.

Tabulated Data:

NSN 1310-01-154-6525- M2A1 Pack
NSN 1310-01-159-3161- M548 Pack
NSN 1310-01-315-1636- PA-120 Pack

Complete round:	
Type	Dummy
Weight	350 g
Length	4.415 in.
Weapons used with	M12940mnl Grenade Launcher, MK19, Mod 3 Grenade Machine Gun
Projectile:	
Body material	Bar alloy aluminum
Color	Gold w/black markings
Propelling charge:	
Cartridge case	M169
Propellant	None
Primer	None
Performance:	
Maximum range	N/A
Muzzle velocity	N/A

Temperature Limits:

Firing:	
Lower limit	N/A
Upper limit	N/A
Storage:	
Lower limit	N/A
Upper limit	N/A
M2A1 Pack:	
* Packing	20 rounds, 2-10 rounds in linked belts
"Packing Box-2 supplied:	
Weight	29.0 lb
Dimensions	14.63 x 12.81 x 9.13 in.
cube	0.99 cu ft

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Packing drawing number --	9209205
M2A1 metal container drawing ----------	7553296

M548 Pack:

*Packing ----------	48 rounds in linked belt
*Packing Box:	
Weight ----------	59.5 lb
Dimensions ----------	18-19/32 x 14-19/32 x 8-19/64 in.
Cube ----------	1.3 cu ft
Packing drawing number---	9362543

PA-120 Pack:

*Packing ----------	32 rounds in linked belt
*Packing Box:	
Weight ----------	42 lb
Dimensions ----------	18.76 x 10.39 x 6.36 in.
Cube ----------	0.72 cu ft
Packing drawing number---	12928042
PA-120 metal container drawing number ----------	12564414

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----------	N/A
Storage compatibility group -----	N/A
DOT shipping class ----------	N/A
DOT designation ----------	N/A
DODAC ----------	1310-B472
Cartridge drawing number ------	9275763

References:

SB 700-20
TM 9-1010-230-23&P
TM 9-1010-230-10
TM 9-1300-251-20
TM 9-1300-251-34

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CHAPTER 7

FUZES

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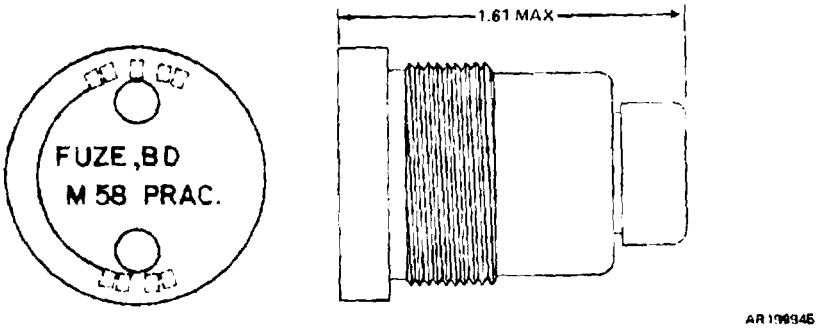
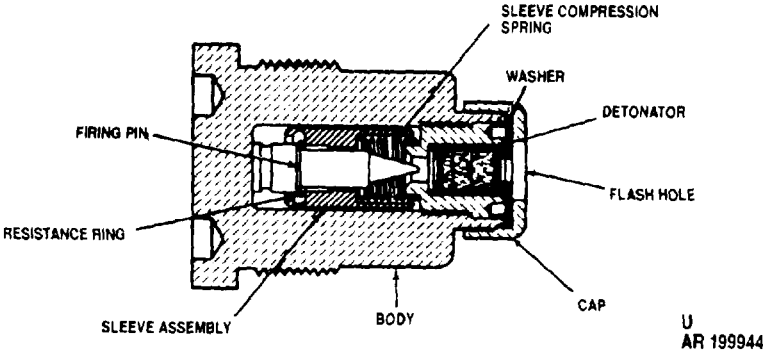
FUZE, BASE DETONATING: M58, PRACTICE





Type Classification:

Std OTCM 37119 dtd 1959.

Used:

Base Detonating Fuze M58 Practice is used with target practice cartridges for 37mm subcaliber guns.

Description:

The fuze has a brass or steel body containing the firing pin and a spring-loaded sleeve assembly. A resistance ring holds the tiring pin at the rear of the sleeve and away from the detonator prior to firing; there are no bore-safety provisions or external safety devices. The detonator is housed in a brass detonator holder forward of the firing pin. A brass or steel cap and aluminum washer close the forward end of the fuze. A hole is provided in the closing cap to allow detonator flashthrough.

Functioning:

Setback from weapon firing forces the resistance ring back over the shoulder of the firing pin and into a groove near the back of' the firing pin, locking the pin in a more forward position in the sleeve. During the flight of the projectile, the combined firing pin and sleeve assembly is held out of contact with the detonator by the sleeve compression spring. Upon impact, inertia of the sleeve and firing pin overcomes the spring and drives the pin into the detonator.

Tabulated Data:

Type	BD
Weight	0.29 lb
Length Overall	1.61 in.
Thread size	1.02-1SNS-3 (LH)
Assembly Dwg. No.:	
Practice	73-1-191

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M18.

Limitations:

None.

References:

TM 9-1015-203-12
TM 9-1025-200-12&P
TM 9-1800-251-20

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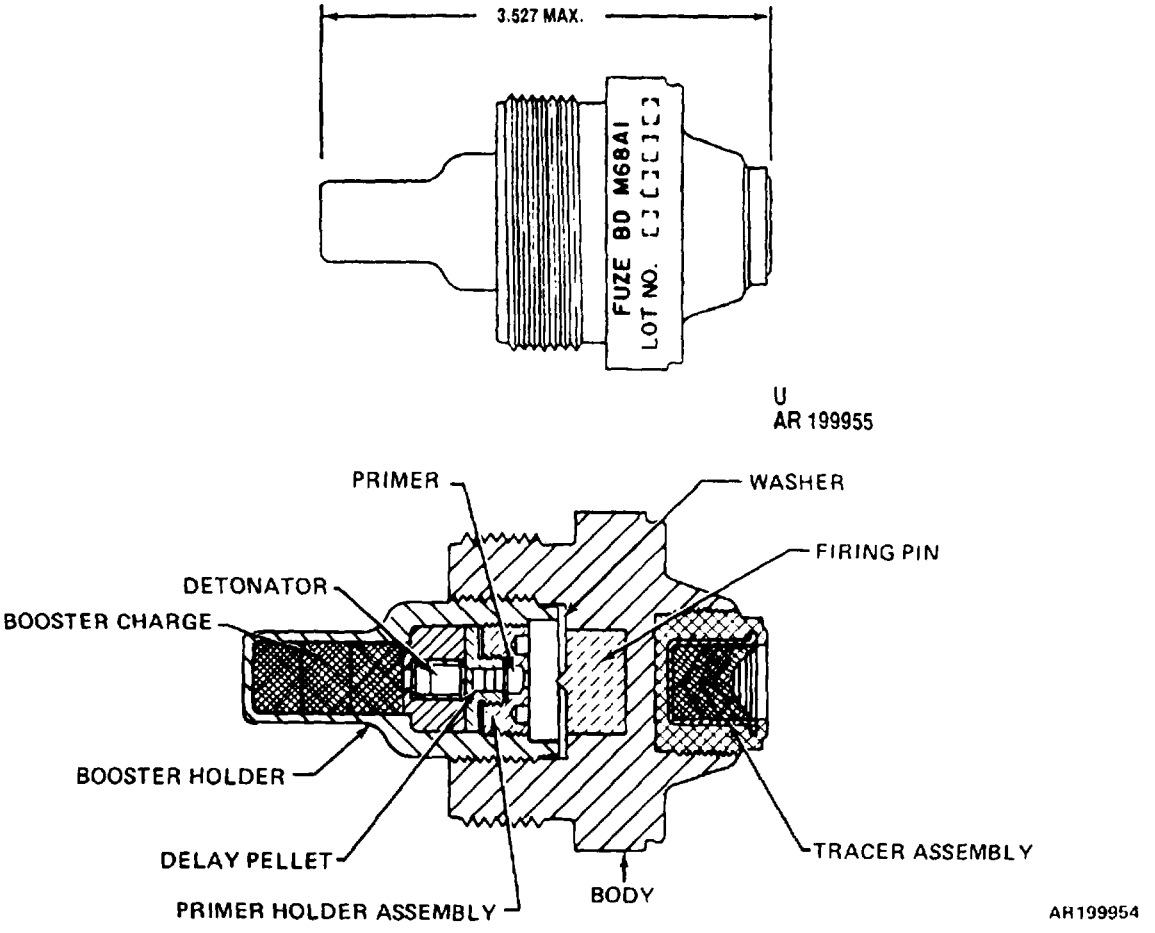
FUZE, BASE DETONATING: M68 SERIES



Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Base Detonating Fuzes M68 series are delay-action fuzes used with 90mm gun, APC-T cartridges.

Description:

Fuzes are of the simple inertia type, without bore-safe provision. The body of the fuze is threaded externally to fit the projectile base cavity, and is threaded internally to receive a booster holder assembly containing a tetryl booster charge and a detonator. The booster-holder assembly, in turn, is threaded internally to receive a primer holder assembly containing a primer and black powder delay pellet. The firing pin is contained within the fuze body and is restrained prior to impact by a soft steel washer. The base of the fuze is threaded internally to receive a tracer assembly. The tracer assembly is contained in the base of the fuze.

Functioning:

The tracer composition in the base of the fuze is ignited by the flash of the propelling charge and provides a visible trace for at least 3 seconds. There is no other action until impact, when the inertia of the firing pin breaks the soft steel washer, and the firing pin point strikes the primer. The primer flash ignites the black powder delay pellet. After a burning time of 0.01 second, the delay pellet ignites the detonator which fires the booster charge to detonate the filler the projectile.

Difference Between Models;

Fuze M68A1 is slightly larger but lighter than Fuze M68; otherwise the fuzes are identical in design.

Fuze M68 contains primer No. 26.
Fuze M68A1 contains primer No. 31.
M68 tracer is press fit.
M68A1 tracer is threaded.

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Tabulated Data:

Type ---------- BD
Weight:
M68A1---------- 1.44 lb
M68---------- 1.56 lb
Length Overall
M68A1 ---------- 3.527 in.
M68 ---------- 3.46 in.
Thread size ---------- 2.0 in.-1ONS-1 (LH)
Assembly Dwg. No.;
M68 series ---------- 73-2-181

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Primer No. 26 (M68), No. 31 (M68A1), black powder delay pellet, Detonator M17, tetryl booster Charge, and Tracer Assembly M5.

References:

TM 9-1300-251-20

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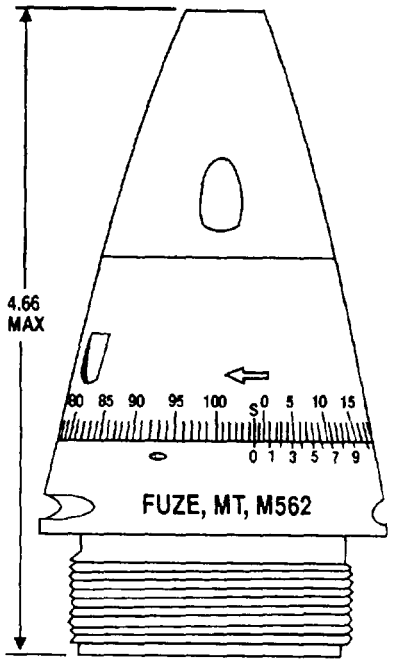
FUZE, MECHANICAL TIME: M562



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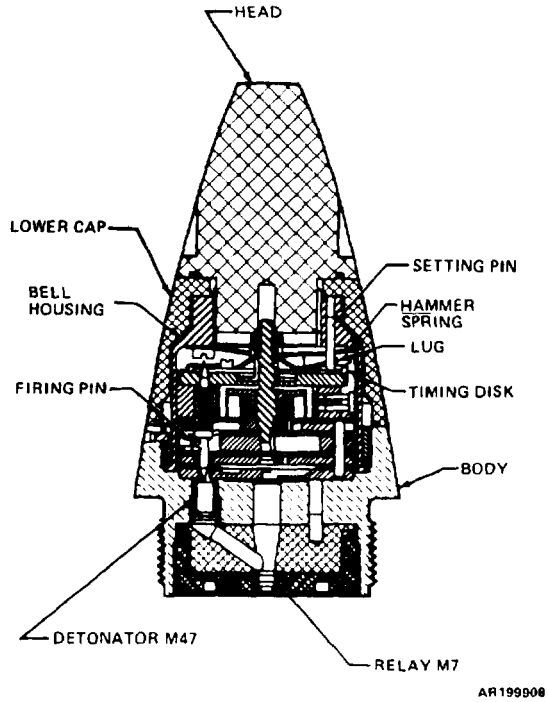

Type Classification:

Std AMCTC 267 dtd 1962.

Use:

Fuze M562 is a mechanical time type used with 4.2-inch mortar illuminating cartridges.

Description:

The aluminum head is threaded into the bell housing under the lower cap. The rotatable lower cap has an exterior scale graduated in seconds from 0 to 100, plus a safety line stamped **"S".** The movement is a spring driven clockwork and escapement mechanism to provide the fuze functioning time desired. The steel body of the fuze contains a detonator near the top and a relay in a retainer at the base. A fuze setting line and vernier scale are inscribed on the exterior.

Functioning:

When the lower cap is rotated to set the time, the timing disk of the movement is rotated also by means of a setting pin lodged in an upraised lug on the disk. When the cartridge is fired, setback causes a hammer spring to strike the upraised lug, releasing the disk from the setting pin. Centrifugal force releases the detents (not shown) holding the timing movement. When the timing disk has rotated to the preset time, a notch in the disk engages the firing arm. The firing arm slides into the notch and turns, permitting the spring loaded firing pin to strike the detonator and initiate the explosive train.

Tabulated Data:

Type	MT
Weight	1.56 lb
Length:	
Visible	3.76 in.
Overall	4.66 in.
Thread size	2-12 UNS-1
Assembly Dwg. No	10520791

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	80°F (for not more than 3 days)

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Storage: (continued)
Upper limit ---------- +160°F (for not more than 4hr/day)
*Packing ---------- 8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:
Weight ---------- 45.2 lb
Dimensions ---------- 14-7/8 x 12-13/16 x 9-1/4 in.
Cube---------- 1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ---------- 1
Storage compatibilty group ------ B, N & E
DOT shipping class ---------- C
DOT designation ---------- TIME FUZES

DODAC ---------- 1390-N283

Explosive Components:

Detonator M47 and Relay M7.

References:

TM 9-1300-251-20
SC 1340/98-IL

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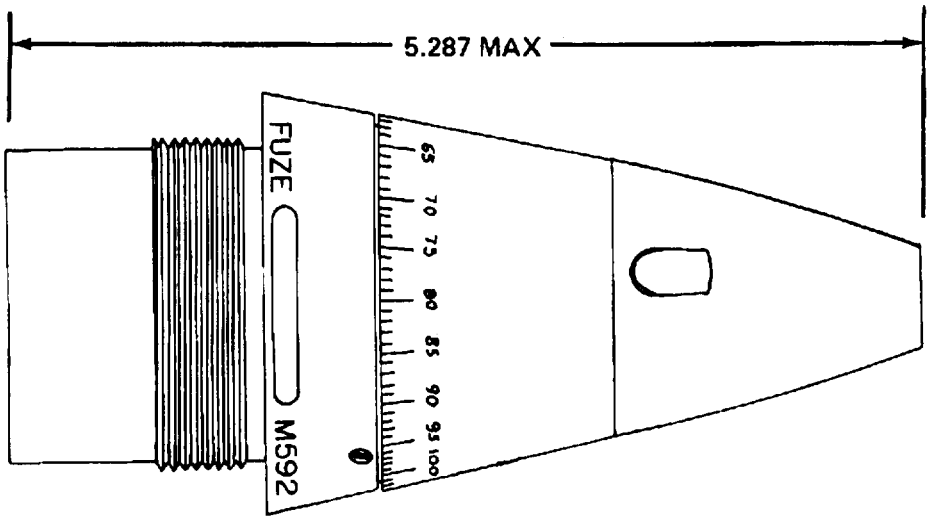
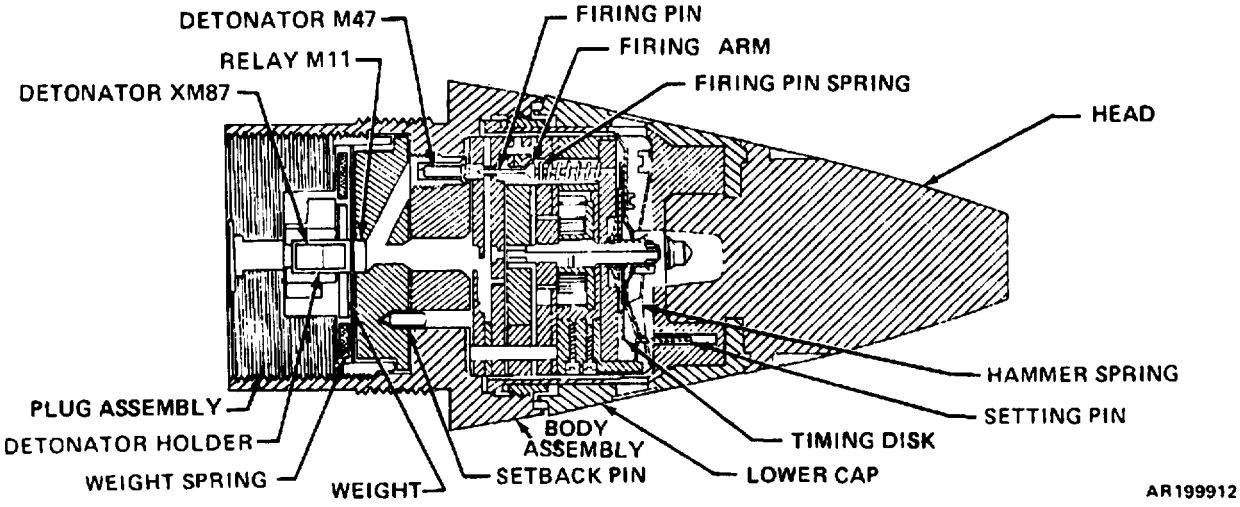
FUZE, MECHANICAL TIME: M592 SERIES





Type Classification:

Use:

Mechanical Time Fuzes M592 series are designed especially for use with flechette-loaded 106mm Cartridge M581.

Description:

The fuze consists of an aluminum head, a lower cap containing the timing movement, and a steel body containing a detonator holder and plug assembly The rotatable lower cap is inscribed with **range** graduations from 200 to 3300 meters and an MA mm-k for muzzle action, The movement in the lower cap is a spring-driven clockwork mechanism combined with a muzzle-action feature activated by setback and centrifugal force, and uses the same firing pin as the time mechanism. The detonator holder located in the fuze body above the closing plug contains Detonator XM87. Two overlapping weights between Relay M11 at the upper end of the body and Detonator XM87 are moved by centrifugal force and constitute an interrupter-type safety provision.

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Functioning:

Muzzle Action: Setback upon weapon firing causes the alpha weights (XM592) or the setback pins (M592) to move downward and allow centrifugal force to move the weight above the timer, uncovering a notch in the timing disk. At the same time, centrifugal force moves aside the weights between Relay M11 and Detonator XM87 in the base, With the notch in the timing disk uncovered, the tiring arm slides inward and turns permitting the spring-loaded firing pin to strike Detonator M47 and initiate the explosive train. Detonation will occur immediately when the projectile leaves the muzzle.

Timed Action: Turning the lower cap to set the fuze, simultaneously rotates the timing disk by means of a setting pin lodged in an upraised lug on the disk, Setback allows a hammer spring to strike the upraised lug, thus releasing the timing disk from the setting pin, Centrifugal force releases the timing movement. When the timing disk has turned the preset time, the disk notch engages the firing arm, The firing arm turns to allow the firing pin to strike the detonater as above. If set for range, the fuze will function approximately 125 meters prior to range setting (optimum standoff for payload dispersion).

Difference Between Models:

Fuze XM592 uses four alpha weights to provide arming for the muzzle action feature. In Model M592, the weights are replaced by setback pins.

Tabulated Data:

Type	MT
Weight	1.41 lb
Length:	
Visible	3.787 in.
Overall	5.287 in.
Thread size	1.8-16UNS-1A
Assembly Dwg. No.	10542850

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	8 fuzes in metal container; 2 containers in wirebound box

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1
Storage compatibility group	B, E & N
DOT shipping class	C
DOT designation	FUZE, TIME HANDLE CAREFULLY

Explosive Components:

Detonator M47, Relay M11 and Detonator XM87.

Limitations:

Firing over the heads of exposed friendly troops is prohibited.

References:

TM 9-1000-205-12
TM 9-1300-251-20
SC 1340/98-1L
SB 700-20

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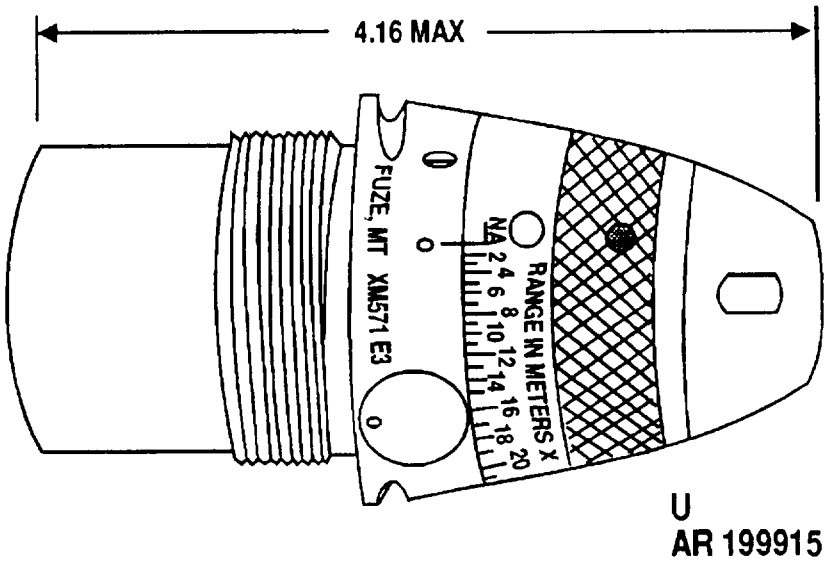
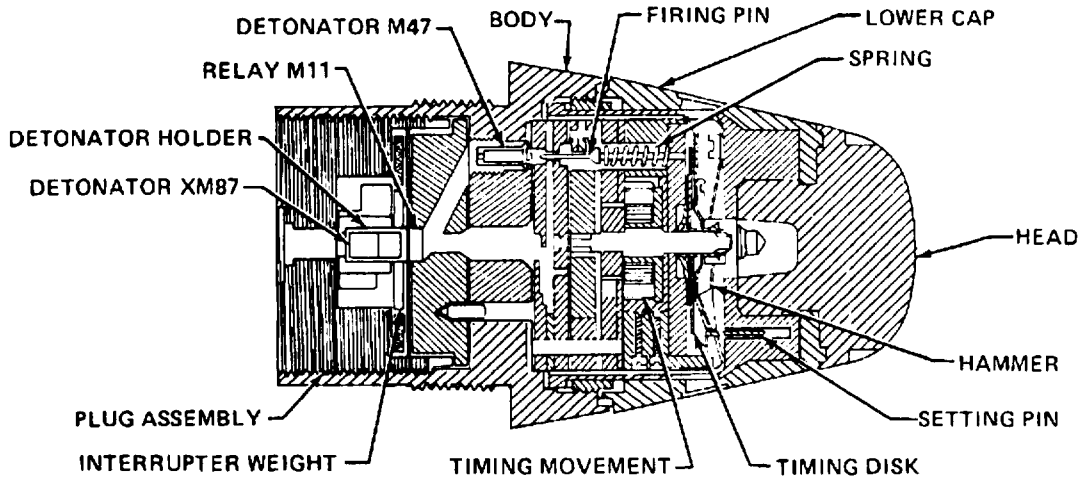
FUZE, MECHANICAL TIME: M711





Type Classification:

Use:

Mechanical Time Fuze M711 is designed especially for use with flechette-loaded 90mm Cartridge M580.

Description:

The fuze consists of an aluminum head, a lower cap containing a timing movement, and a body containing a detonator holder and plug assembly, The rotatable lower cap is inscribed with range graduations from 200 to 4400 meters and an MA mark for muzzle action. The movement in the lower cap is a spring-driven clockwork mechanism combined with a muzzle-action feature activated by setback and centrifugal force, and utilizing the same firing pin as the time mechanism. The detonator holder located in the fuze body above the closing plug contains Detonator XM87. Two overlapping weights between Relay Mll at the Upper end of the body and Detonator XM87 are moved by centrifugal force and constitute an interrupter-type safety provision.

Functioning

Muzzle Action: Setback upon weapon firing causes the setback pins to move downward and allow centrif'uga] force to move the weight above the timer, uncovering a notch in the timing disk. At the same time, centrifugal force moves aside the weights hetween Relay Ml 1

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and Detonator XM87 in the base, With the notch in the timing disk uncovered, the firing arm slides inward and turns, permitting the spring-loaded firing pin to strike Detonator M47 and initiate the explosive train Detonation will occur immediately when the projectile leaves the muzzle.

Timed Action: Turning the lower cap to set the timmg simultaneously rotates the timing disk b means of a setting pin lodged in an upraised lug on the disk, Setback permits a hammer spring to strike the upraised lug, thus releasing the timing disk from the setting pin, Centrifugal force releases the timing movement. When the disk has turned the preset time, the disk notch engages the firing arm. The firing arm turns to allow the firing pin to strike the detonator as above, The fuze is designed to function for optimum payload dispersion for the range set. If preset for 200 to 500 meters, the fuze will function 100 meters short of the range set; if preset for 600 to 4400 meters, the fuze will function 75 meters short.

Tabulated Data:

Type ---------- MT
Weight ---------- 1,32 lb
Length:
  Visible ---------- 2.666 in.
  Overall ---------- 4.166 in.
Fuze minimum setback
  to function (g's) ---------- 15,000
Fuze maximum setback
  withstood (g's) ---------- 22,000
Fuze minimum spin for
  satisfactory functioning
    (rpm) 19,000
  Assembly Dwg. No---------- 10542845
  Thread size ---------- 1.9-16UNS-2A

Temperature Limits:

Firing:
  Lower limit ---------- -40°F
- Upper limit ---------- +125°F
Storage:
  Lower limit ---------- 80°F (for not more than 3 days)
  Upper limit ---------- +160°F (for not more than 4 hr/day)
  Packing ---------- Fuze is shipped in assembly with complete round

Explosive Components:

Detonator M47, Relay M11, Detonator XM87.

limitations:

Firing overhead of friendly exposed troops is prohibited. When firing muzzle action, assure that all personnel clear area in front of and immediately to sides of the weapon, and take cover.

References:

TM 9-1300-251-20
SB 700-20

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Explosive Components:

M577:
Detonator M55, Detonator M94

MILD Detonating Fuze Lead, Multipurpose (PA510)

M577A1:
Detonator M94

Lead, Multipurpose (PA51O)

Limitations:

For point detonating function, a minimum impact velocity equivalent to 450 fps against l/8-inch steel plate is required, The fuze may not function or may function on impact if set for a time-to-airburst shorter than required for arming.

References:

SC 1340/98-IL
SB 700-20
TM 9-1015-203-12
TM 9-1015-215-10
TM 9-1015-234-10
TM 9-1025-200-12&P
TM 9-1025-211-10
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-257-10-1
TM 9-2350-304-10
TM 43-0001-28-4
TM 43-0001-28-5
TM 43-0001-28-6
TM 43-0001-28-8
TM 43-0001-28-9
TM 43-0001-28-10

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Explosive Components:

M582:

Detonator M55, Detonator M94 Booster Standard Comp A-5 MILD Detonating Fuze Lead Multipurpose (PA510).

M582A1:

Detonator M94 Booster Standard Comp A-5 Lead, Multipurpose (PA510).

Limitations:

For point detonating function, a minimum impact velocity equivalent to 450 fps against l/8-inch steel plate is required. The fuze may not function or may function on impact if set for a time-to-airburst shorter than required for arming.

The M582 series fuze is authorized for firing with the 8-inch, M650 projectile in the rocket-off mode only.

References:

SC 1340/98-IL
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1025-200-12&P
TM 9-1025-211-10
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-2350-304-10
TM 43-0001 -28-4
TM 43-0001 -28-5
TM 43-0001 -28-6
TM 43-0001 -28-7
TM 43-0001 -28-8
TM 43-0001 -28-9
TM 43-0001-28-10

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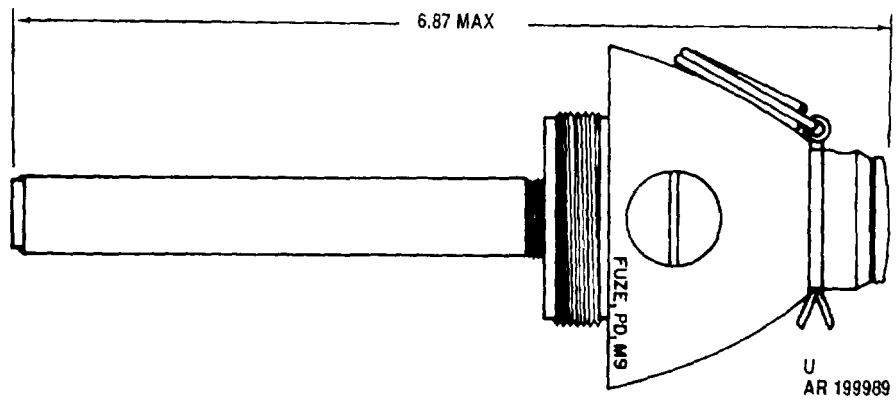
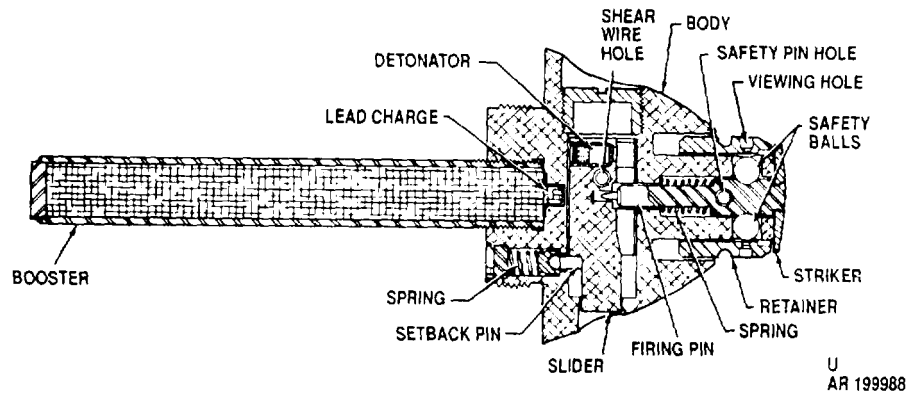
FUZE, POINT DETONATING: M9





Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point Detonating Fuze M9 is a superquick action impact fuze used with 4.2-inch mortar HE cartridges.

Description:

The aluminum body of the fuze contains a spring-loaded striker at the nose mounted within a movable circular retainer. The striker and integral firing pin are retained in the unarmed position by a shear wire (not shown in illustration) and a removable safety pin. Two safety balls are positioned by detents (not-shown) between the striker and the retainer. A slider containing the detonator and designed to position the detonator in line with the firing pin is mounted transversely in the fuze body and is secured by a setback pin. A hole or slot is present in the retainer of some fuzes for viewing position of the safety balls. A 4-inch long tetryl booster is threaded into the base of the fuze.

Functioning:

The safety pin is pulled from the fuze just prior to firing. Upon firing and as the cartridge moves up the barrel, the retainer. actecd upon by setback, breaks the shear wire and positions a slot in the retainer wall to accept the safety balls. Centrifugal force moves the safety balls into this detent, and this movement assists the striker spring in forcing. the striker forward about l/4-inch into armed position. The firing pin on the lower end of the striker is with - drawn from a hole on the slider. At the same time, setback from firing withdraws the setback pin from the slider Centrifugal force

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causes the slider to move outward until a shoulder contacts a stop on the fuze body, and another pin, also activated by centrifugal force, locks the slider in armed position. The detonator is now aligned with the firing pin, and detonation of the projectile will be on superquick action at impact.

Tabulated Data:

Type	PD
Weight	0.98 lb
Length:	
Visible	2.16 in. max
Overall	6.87 in.
Thread size	1.7-14NS-2A RH
Assembly Dwg. No.	73-2-312

Temperature Limits:

Refer to complete round for upper and lower limits.

Packing:

See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Explosive Components:

Detonator and tetryl booster.

Limitations:

None.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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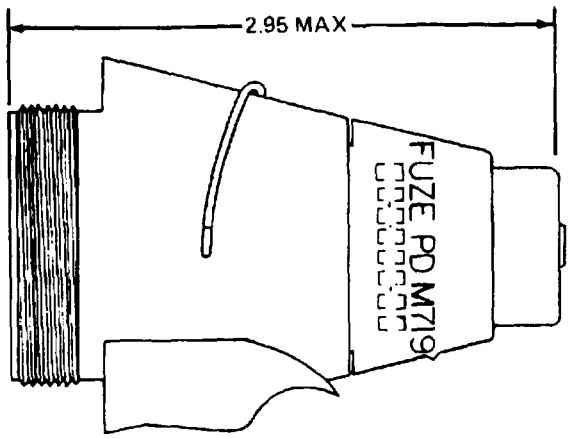
FUZE, POINT DETONATING: XM719



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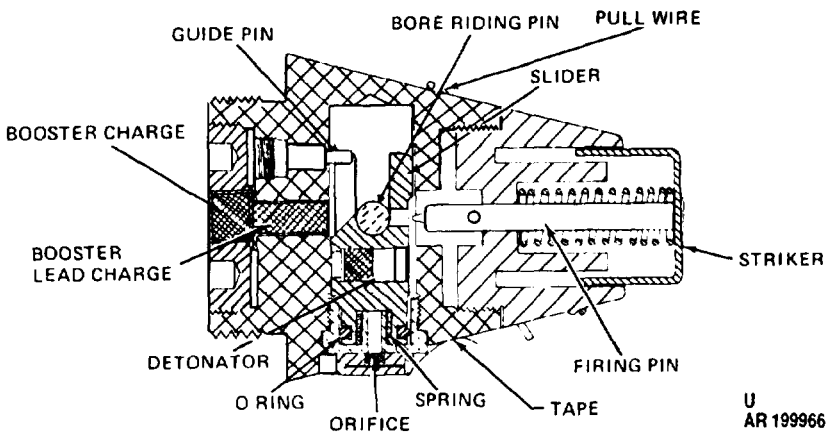

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Type Classification:

Development.

Use:

Point Detonating Fuze XM719 is a super quick delayed arming impact fuze, used with 60mm mortar WP Smoke cartridges.

Description:

The aluminum fuze head contains a spring-loaded striker and firing pin. A spring-loaded cylindrical slider, mounted transversely in the aluminum fuze body, contains the detonator and is equipped with an O-ring pressure seal. Inbore safety is provided by a spring-loaded bore riding pin which locks the slider. A pull wire restrains the setback pin (not shown in illustration) which locks the bore riding pin. Tape and a plastic disk protect the metering orifice. The fuze base contains a tetryl booster lead charge and a small tetryl booster charge.

Functioning:

Setback force from weapon firing forces the setback pin rearward against the pin spring and releases the bore riding pin. The bore riding pin then contacts the bore of the mortar and is ejected when the cartridge leaves the muzzle. Ejection of the bore riding pin unlocks the slider. The slider is moved by a compression spring, and because of the O-ring seal, a vacuum is formed behind the slider. The vacuum is relieved gradually by the bleed air orifice. The metered pressure relief through the orifice provides 1.5 to 6 seconds delay before the slider completes the movement necessary to align the detonator with the firing pin and arm the fuze. On impact, the striker and firing pin are depressed, and inertia throws the slider with detonator forward into the firing pin and arm the fuze. On impact, the striker and firing pin are depressed, and inertia throws the slider with detonator forward into the firing pin. Detonation is on superquick action through the booster lead charge and tetryl booster charge.

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Tabulated Data:

Type ---------- PD
Weight ---------- 0.25 1b
Length:
Visible ---------- 2.45 in.
Overall ---------- 2.95 in.
Thread size ---------- 1.5in.-12 NF-1
AssemlblyDwg. No. ---------- 73-1-161

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator tetryl booster lead charge, and tetryl booster charge.

References:

TM 9-1015-215-10
TM 9-1300-251-20
SC1340/9t3-IL

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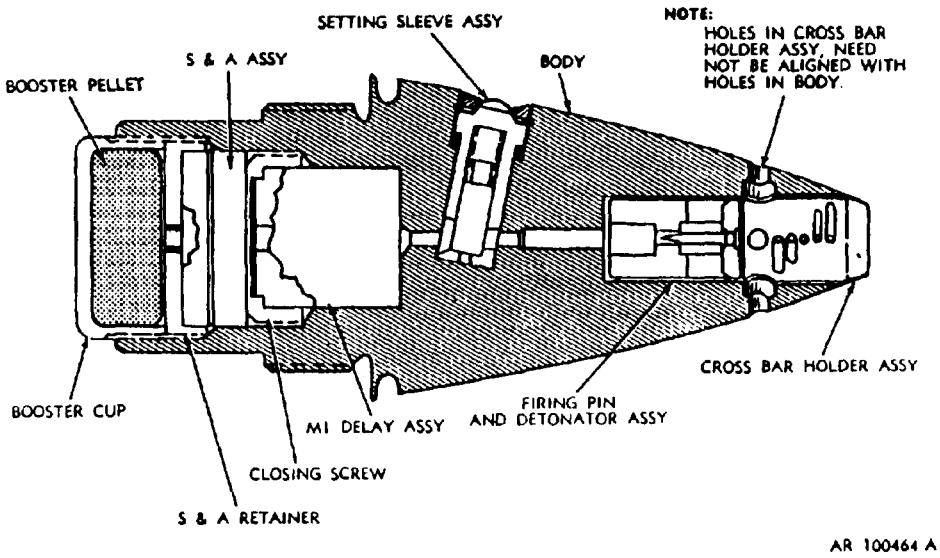
FUZE, POINT DETONATING: M739 and M739A1



Type Classification:

M739 - Std A MSR 02756077 December 1974,
- Std B MSR 08826010 August 1982,
M739A1 - Std A MSR 08826011 August 1982.

Use:

Point Detonating Fuzes M739 and M739A1 are selective superquick and 0.05 second delay (M739) or auto-delay (M739A1) impact fuzes designed for use in all standard HE artillery 4.2 inch Mortar, 105mm through 8-inch Howitzers and 175mm Guns.

Description:

The M739 series fuzes are the latest improved version of the selective impact fuzes. The fuze body is a one-piece design of solid aluminum and has a standard 2-inch threaded base to match projectile nose and fuze cavity. The fuze consists primarily of five (5) modular subassemblies: (1) crossbar and holder assembly (2) firing pin and detonator assembly, (3) setting sleeve assembly, (4) M1 Delay Plunger Assembly (M739), or Impact Delay Module Assembly (M739A1), and (5) the safe and arming assembly.

The crossbar and holder assembly is a rain insensitive sleeve that allows firing in heavy rain with reduced probability of downrange premature functioning. The assembly is in the nose section of the fuze and consists of five (5) crossbars which break up raindrops and foliage and thus reduce fuze initiation sensitivity without affecting ground or target impact sensitivity.

The firing pin and detonator assembly is located below the rain insensitive sleeve and provides the superquick action on impact. The firing pin is held in position by a firing pin support which prevents initiation of the M99 Stab Detonator until impact.

The setting sleeve assembly (interrupter) is located in the side of the fuze body extending through the flash path of the M99 Detonator and thus provides selection of a PD mode which does not interrupt the flash from the detonator; or a delay mode which prevents the detonation flash from initiating the explosive train.

The M1 Delay Plunger Assembly is located in the rear portion of the M739 fuze and provides a 0.050 second fuze initiation delay for target penetration when the setting sleeve is set “delay”, When not set “delay”, the M1 delay plunger provides a back-up and graze action function for the superquick setting.

The M739A1 fuze contains an Impact Delay Module (IDM) assembly instead of the M1 Delay Plunger Assembly. The IDM provides fuze initiation delay based upon the completion of mechanical actions caused by projectile deceleration and will function immediately after passing through the target. Function occurs when a spring loaded firing pin is released. There are no explosive components contained within the IDM.

The safe and arming (S&A) module is below the delay assembly. It contains a rotor with a M55 detonator, an escapement to prevent the detonator from aligning with the explosive firing train until safe arming distance

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is achieved, both setback and spin locks to prevent accidental arming prior to firing, The explosive lead when initiated will detonate the booster pellet made of 22 grams of Composition A5 which is held by an aluminum booster cup assembled into the base of the fuze.

Functioning:

Condition as Issued:

In the firing pin and detonator assembly the firing pin is held over the SQ detonator by a collapsible support. The setting sleeve assembly interrupter blocks the flashhole between detonator and S&A assembly.

The S&A assembly is not armed since the M55 detonator which is contained in the S&A rotor is held out of axial alignment by a setback pin and spinlock detents.

The delay assembly is not armed because the detents hold the plunger from moving forward and beginning the sequence of events required for function.

Prior to Firing:

For delay action the setting sleeve must be turned clockwise so that the slot is pointed toward "Delay". This keeps the flashhole blocked regardless of the interrupter position, The setting sleeve may be returned counterclockwise to the "SQ" setting at will.

For super quick (SQ) action, the selector normally requires only inspection to assure that the slot of the selector sleeve is pointed toward the "SQ" mark, A coin, screwdriver or tip of the fuze wrench M18 may be used to turn the slot to the desired setting,

Action Caused by Setback and Spin in Firing the Projectile:

In the interrupter assembly centrifugal force moves the interrupter outward. When the setting sleeve is set for "SQ" the interrupter unblocks the flashhole in its move outward.

In the delay assembly centrifugal force moves each detent outward and locks each detent in the outward position by means of the centrifugal plunger pin lock.

In the S&A assembly the setback pin is disengaged from the rotor and the spinlocks move outward under centrifugal force allowing the rotor to turn and carry the M55 into line with the flashhole, This arming action is briefly delayed by a runaway escapement. The arming distances for associated cannon and mortar systems are given in the tabulated data. The rotor is held in its armed position by the rotor lock pin.

Action in Flight:

The plunger restraining spring in either the M739 or M739A1 delay assembly holds the plunger rearward.

When fired in rain the crossbars, after erosion of the nose cap, serve to break up raindrops and prevent functioning of the superquick detonator. Excess water is expelled through the holes in the crossbar holder assembly due to centrifugal force created by the spin of the round.

Action Upon Impact:

When the projectile hits a soft impact surface, the material ruptures the nose cap and then flows between the crossbars to strike the firing pin. If the projectile hits masonry or rock, the entire crossbar holder assembly will drive the firing pin into the SQ detonator.

For delay setting, the solid structure of the fuze body protects the delay assembly so that it will function after penetrating the target. Within the delay assembly the plunger travels forward upon impact, The M739 Fuze contains an M1 Delay Plunger Assembly and when the plunger travels forward an explosive delay element is carried by the plunger into a stationary firing pin held by the Ml housing thus initiating a timed delay function. The M739A1 Fuze contains an impact delay module and when its plunger travels forward a series of mechanical actions are initiated culminating in the release of a spring loaded firing pin propelled into the M55 detonator contained in the S&A.

In normal functioning with superquick action, the delay action has no effect, and the superquick detonator will have fired the detonator M55 in the rotor and the S&A assembly before the delay assembly can complete its action. However, should the SQ action fail, the projectile will function with delay action rather than become a dud,

Tabulated Data:

Type	PD
Assembly Drawing No.	9258605 (M739); 9345332 (739A1)
Length:	
Visible	3.76 in. (Ref)
Intrusion into projectile	2.21 in. (max)
Overall	5.97 in. (Ref)
Weight	1.5 lb
Thread	2.00 -12UNS-1A

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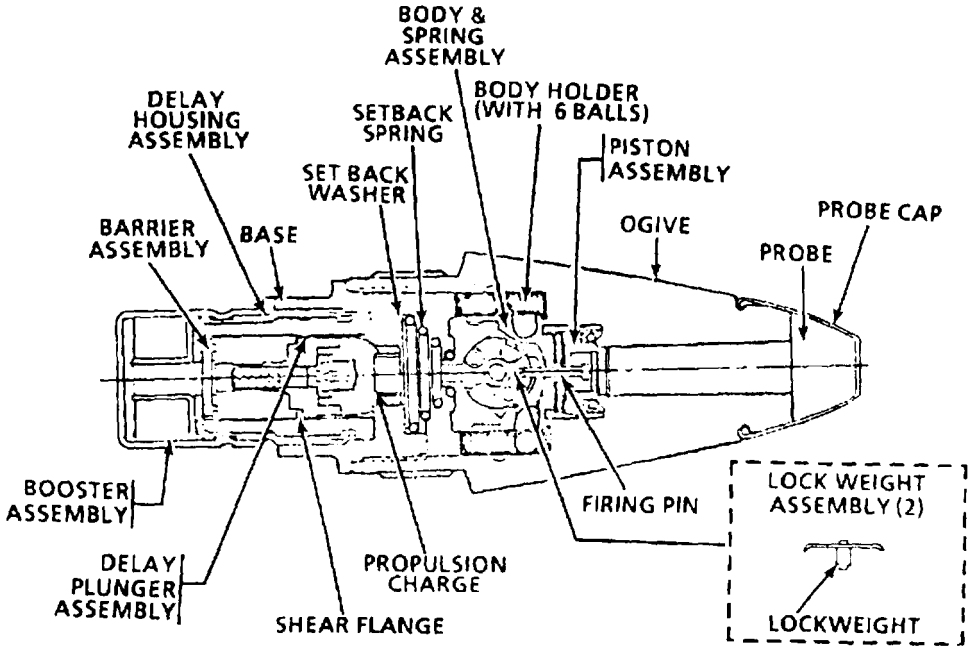
FUZE, POINT DETONATING: M761



Type Classification:

Std MSR 05826003.

Use:

The Fuze Point Detonating M761 is used with the Cartridge 40mm: HE, M811 for the Sergeant York 40mm gun M247, against air and surface targets.

Description:

The M761 point detonating delay fuze includes a piston assembly, which carries the firing pin and a detonator contained inside the body assembly, The plunger assembly provides a 300 microsecond delay after impact.

The primary fuze operation is divided into three steps: setback, arming, and detonation. There are three different methods of detonation: target impact, graze impact, and self-destruct, Prior to launch, the piston and body assemblies and body holder are resting on the expanded setback spring. The rotor is maintained off center by the firing pin and lockweight assembly.

Setback - During launch, the piston and body assemblies and body holder set back against the setback spring. Air is displaced through ports into the chamber above the piston. High spin forces cause the centrifugal lock weights of the primary fuze and the barriers of the delay modules to move against their springs. This lockweight removes one constraint on the rotor in the safe position, Centrifugal force also causes the locking balls in the primary fuze to seat in the detent groove.

Functioning:

Arming - As the projectile exits the muzzle, the acceleration force dissipates, and the piston spring moves the piston away from the body assembly. The body assembly is retained by the locking balls which overcome the force exerted by the setback spring. The piston motion is controlled by air bleed through a porous metal restrictor. The air bleed provides a nominal mean arming delay of 40 to 60 meters over the temperature range from -50°F to + 140°F. When the piston reaches the forward position, the firing pin withdraws sufficiently to allow the rotor to move the armed position. Centrifugal force acting on the roller weight causes it to move into a groove and lock the rotor in the armed position. The fuze is fully armed when the detonator is in line with the firing pin.

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Detonation:

Impact against targets - The impact shock is transmitted by the probe to the piston assembly, which is driven rearward until the firing pin strikes the detonator.

Graze impact - Graze function occurs when lateral shock causes the locking force of the body holder balls to be released and overcome by the setback spring. As the body assembly is moved forward the detonator is driven into the firing pin.

Self-Destruct - The self-destruct function depends on the reduction of locking-ball centrifugal force as the projectile spin decays. When the setback spring force is sufficient to overcome the locking-ball force, the detonator in the body assembly is driven forward into the firing pin.

Tabulated Data:

Type	PD
Weight w/fuze	0.119 lb (0.054 kg)
Length	2.75 in. (69.7 mm)
Arming time	0.06 min sec
Post-impact delay time	0.3 min sec
Time to self-destruction	8.5+2 sec
Assembly drawing number	28117739

Temperature Limits:

See complete round for upper and lower limits.

Limitations:

None.

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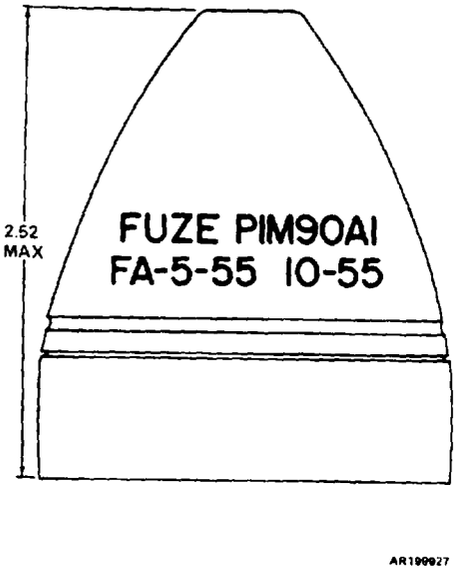
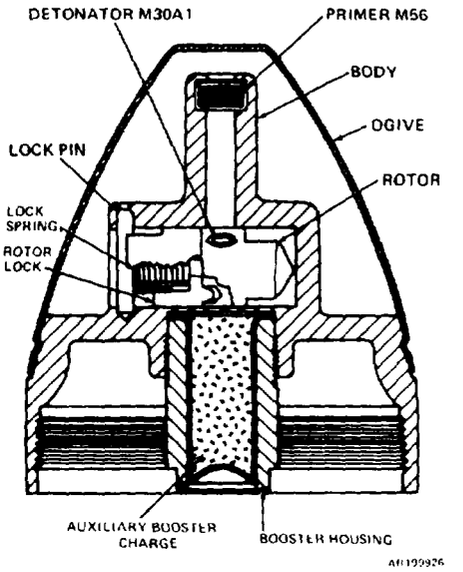
FUZE, POINT INITIATING: M90A1 or M90





Type Classification:

C & T OTCM 37119 dtd 1959.

Use:

Fuze M90A1 or M90 is a single-action, super quick point-initiating fuze designed for use with 57mm HEAT projectile.

Description:

The fuze has a diecast aluminum body with a neck extending forward to house a primer. A rotor with a lock and lock spring is mounted transversely in the fuze body, and carries a detonator. An auxiliary booster housing threaded into the base of the fuze body carries a booster charge. The base of the fuze body is threaded internally for assembly over the nose of the projectile, and the entire forward end with mechanical parts is covered with a thin steel ogive.

Functioning:

After firing, centrifugal force from projectile rotation withdraws the rotor lock against the lock spring. The rotor cannot move while affected by the setback force of firing, but after setback the rotor turns to align the detonator with the primer and with the auxiliary booster charge. On impact, crushing of the ogive fires the primer which initiates the detonation train to the projectile.

Tabulated Data:

Type ---------- PI
Weight ---------- 0.256 lb
Length:
  Visible ---------- 2.52 in.
  Overall ---------- 2.52 in.
  Thread size ---------- 2.095 -18NS-1
  Assembly Dwg. No. ---------- 73-2-23

Explosive Components:

Primer M56, Detonator M30A1, and auxiliary Booster M122.

References:

TM 9-1300-251-20

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There is little hazard in firing these fuzes over friendly territory; however, in the case of personnel or installations close to, or in the target area, proper consideration should be given to the following:

Avoid firing 105mm or smaller projectiles at targets closer than 320 meters (350 yards) to friendly positions.

If firing over crests or ridges, arming should be set to be delayed until the projectile has passed the irregularity, clearing it by 64 meters (70 yards) or more.

When projectiles are approaching the target area at small angles of approach, the area between the point of full arming of the proximity element and the target may be sprayed by fragments from occasional bursts. At larger angles of approach, because such fragments decelerate and usually reach a state of free fall, they do not constitute a serious hazard.

When the fuze is set for proximity arming, air observation posts may safely be used to direct fire but should not be set up between the weapon and target, The area close to the target should particularly be avoided. To avoid danger from normal or early bursts, aircraft should approach the trajectory or target area not closer than 320 meters (350 yards) for 105mm or smaller projectiles.

After proximity arming, fuzes may function under influence of nearby bursts or fragments. An abnormal number of such air bursts may be experienced from volley, salvo, or rapid fire from adjacent weapons. These functioning may be reduced by increasing the spacing of weapons or increasing the time between the rounds fired. These functioning are not related to downrange premature which may occur anywhere along the trajectory.

To assure maximum reliability, these fuzes should be expended at the highest charge authorized commensurate with the desired range.

References:

TM 9-1015-203-12
TM 9-1015-215-10
TM 9-1300-251-20
TM 9-2350-311-10

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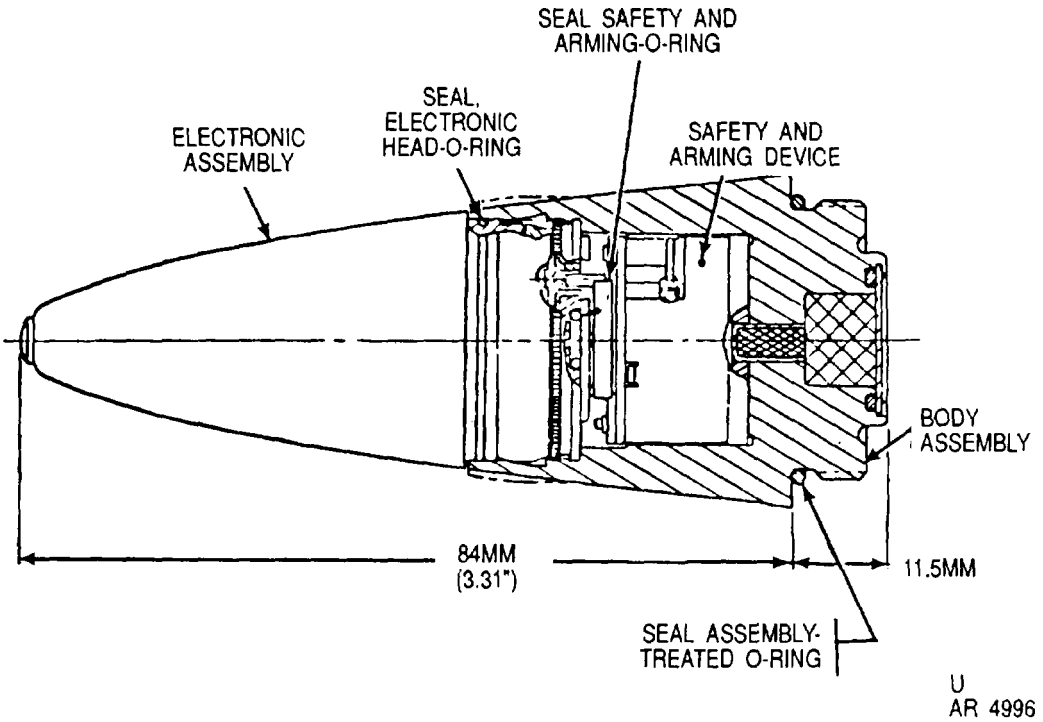
FUZE, PROXIMITY: M766



Type Classification:

Std MSR 05826003.

Use:

Fuze, Proximity: M766 is used with Sergeant York Cartridge, HE, M822 for 40mm gun M247, It is used primarily against aerial targets.

Description:

The M766 Proximity Fuze is an electronic fuze that operates on the Doppler principle, It contains a combination of electronic and mechanical devices that provide a safe and reliable air defense munition, The electronic head of the fuze provides both safety and detonation. A mechanical safe and arm device (MS470 S&A) provides bore safety and maintains out-of-line safety until a safe arm distance is achieved. Electrical arming, which occurs well after muzzle exit, prevents an early ignition signal to the initiator. After electrical arming, the presence of a target that effects the proximity function will result in a firing signal output. The fuze also contains sensitive impact switches that provide fuze function on impact, and an electronic self-destruct feature that results in detonation of the round after a fixed time period. A sensi - tivity regulation device is built into the fuze electronics, so that the triggering threshold is increased as the sea or ground reelection level increases, An inhibition channel (ECCM) allows operation in the presence of potentially interfering signals. The fuze consists principally of three subsystems: the electronic head, the safe and arm device (S&A), and the explosive train, The radome is made of thermoplastic material and the fuze body of aluminum. There are 3 modes of initiation: proximity, impact, and self-destruct.

Functioning:

After firing, arming is obtained approximately 0.2 second after muzzle exit by means of the sector being turned under the Influence of the spin acceleration on the weight to such a position where the electrical igniter conies in contact with the blade contact and where its detonator is just opposite to the relay charge. Ignition is obtained by proximity or impact function. At power application, the master timer begins to count the flight time. When a total time of 17 ± 4 seconds has elapsed without a valid firing pulse from either the proximity or impact mode, the unit will be self-destructed.

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Tabulated Data:

Type	Proximity
Weight	0.24 lb (0.11 kg)
Length	3.31 in. (84.0 mm)
Arming time	0.2 second
Time to self-destruct	17 ± 4 seconds (approx)
Assembly Dwg. No.	12703650

Temperature Limits:

See complete round for upper and lower limits.

Explosive Components:

Igniter	2 mg
Initiator:	
Silver Azide	2 mg
Explosive Detonator:	
Lead Azide	135 mg
Explosive Lead:	
Plastic B	120 mg

Limitations:

None.

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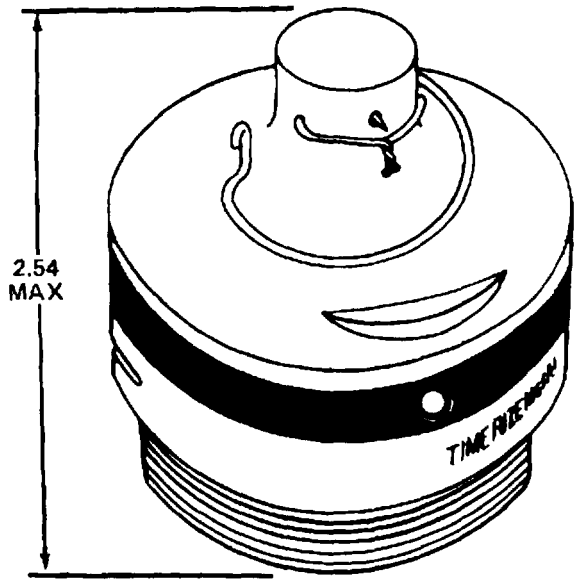
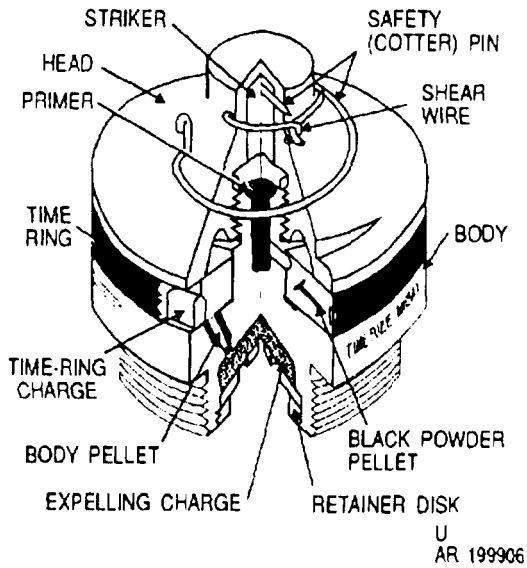
FUZE, TIME: M65A1 OR M65





Type Classification:

Std AMCTC 8346 dtd 1971.

Use:

Time Fuze M65A1 is a powder-train fixed delay type used with 60mm Illuminating Cartridge M83A3. The M65 fuze is used with Cartridges M83A1 and M83A2.

Description:

The fixed time-train is a powder type consisting of a primer, a black powder pellet, a time ring charge loaded for 15-second burning, a body pellet, and a black powder expelling charge, An inertial striker restrained by a shear wire is housed in the nose of the fuze, and the burning components are within the body, There is no setting ring or other provision for varying function time.

Functioning:

Upon firing, setback causes the striker to move rearward with sufficient force to shear the shear wire and strike the primer, The flame from the primer ignites the black powder pellet, which in turn, ignites the time-ring charge, After the flame from the time-ring charge has completed about the time-ring, it ignites the body pellet. The body pellet then ignites the expelling charge. Flame from the expelling charge passes through the apertures in the expelling charge retainer disk, ejecting the parachute and illuminant charge assemblies from the base of the projectile.

Difference Between Models:

Fuze M65A1 differs from Fuze M65 in the following respects: the striker is longer the body is recessed beneath the time-train ring to protect the felt pads which separate the body and ring; the fuze wrench holes in the body are replaced with two fuze wrench slots cut into the lower flange on the body; the time-t train ring is slightly heavier; and the quickmatch is replaced by a black powder pellet.

Tabulated Data:

Type	T
Weight:	
M65A1	0.74 lb
M65	0.77 lb
Length:	
Visible	2.06 in.
Overall	2.54 in.
Thread size	2-20NS-1
Assembly Dwg. No:	
M65A1	9207568
M65	73-3-163

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Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
Packing	Fuze is assembled with cartridge and is not a separate item of issue.

Shipping and Storage Data:

Not Applicable.

Explosive Components:

Primer; black powder time-ring charge; black powder pellet, and black powder expelling charge.

Reference:

FM 23-90

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FUZES, INERT AND DUMMY

Type Classification:

Use:

Inert and dummy fuzes are provided for ammunition such as target practice, test, and drill to simulate fuze assembly.

Description:

Dummy fuzes are manufactured especially for simulation purposes; and inert fuzes are assembled from burned-out or rejected parts of service fuzes. Consequently, in each case, the substitute fuzes resemble the service fuze for which training is conducted, and have the same dimensional and material characteristics. Generally each inert or dummy fuze is designed for use with a specific dummy cartridge according to the following table:

Fuze, PD Inert, M51 series	Inert or dummy nose-fuzed rounds from 75mm to 8-inch
Fuze, PD Inert, M52 series	60mm Cartridge M49 series; 81mm Cartridge M43 series
Fuze, PD Inert, M89	57mm TP Cartridge M306
Fuze, PD Dummy M59	75mm Dummy Cartridge M19, 76mm Dummy Cartridge M20; 105mm Dummy Cartridge M14
Fuze, PD Dummy M69	40mm TP-T Cartridge M19 & Dummy Cartridge M25
Fuze, PD Dummy M73	175mm Dummy Cartridge M458
Fuze , PD Dummy M80	90mm Dummy Cartridge M12 series
Fuze, PD Dummy M553	105mm TP-T Cartridge M393 series

Functioning:

Not applicable.

Tabulated Data:

Fuze (Inert or Dummy):	
Inert, PD, M51 series:	
Weight	2.15 lb
Length:	
Visible	3.74 in.
Overall	5.93 in.
Service Fuzes simulated	PD, M51 series
Inert, PD, M52 series:	
Weight	1.06 lb
Length:	
Visible	2.40 in.
Overall	3.52 in.
Service fuzes simulated	PD, M52 series
Inert, PD, M89:	
Weight	0.37 lb
Length:	
Visible	1.72 in.
Overall	2.52 in.
Service fuzes simulated	PD, M89
Dummy, PD, M59:	
Weight	1.4 lb
Length:	
Visible	3.75 in.
Overall	4.55 in.
Service fuzes simulated	PD, M48 series, M51 series, M535 M557, M572
Dummy, PD, M69:	
Weight	0.225 lb
Length:	
Visible	1.9 in.
Overall	2.375 in.
Service fuzes simulated	PD, MK27
Dummy, PD, M73:	
Weight	2.15 lb
Length:	
Visible	3.77 in.
Overall	5.71 in.
Service fuzes simulated	M51 series, M535, M557, M572
Dummy, PD, M80:	
Weight	3.37 lb
Length:	
Visible	4.75 in.
Overall	6.825 in.
Service fuzes simulated	MT, M43 series

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Dummy, BD, M553:
- Weight ---------- 1.007 lb

Length:
- Visible ---------- NA
- Overall ---------- 4.87 in.
- Service fuzes simulated ----- BD, M53 series

References:

TM 9-1300-251-20
Refer to operator's manuals.

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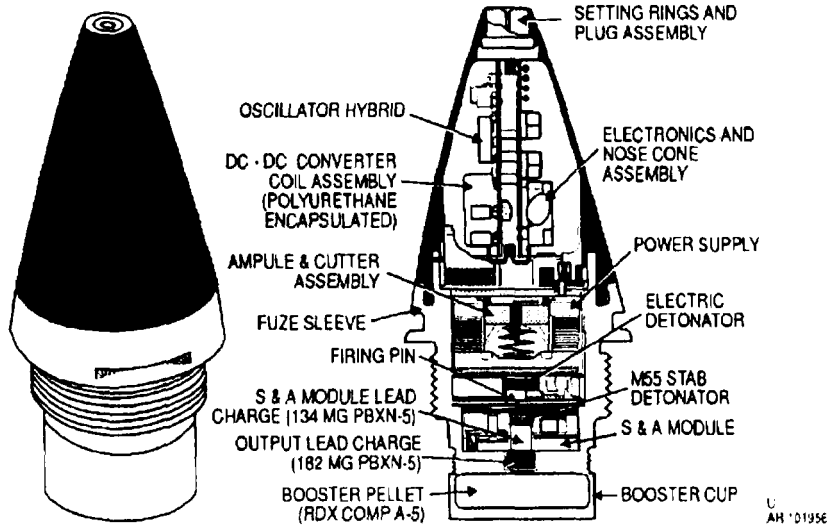
FUZE, ELECTRONIC TIME: M587



Type Classification:

Std MSR 03796007.

Use:

Electronic Time Fuze M587 is used with high explosive and related projectiles where a fuze explosive booster pellet is required to initiate the high explosive filler. The projectile must have a standard 2-inch thread fuze well cavity.

Description:

This electronic fuze has a black anodized aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity. The fuze nose has a series of rings. This is the means by which the fuze is set, a series of pins within the fuze setter makes contact with the series of rings to import the electrical impulses which set the desired time. The fuze will provide setting time from 0.2 to 200 seconds in increments of tenths of a second. The setting of the fuze is accomplished by the use of the M36 Fuze Setter which is a hand-held battery powered electronic device that time sets the fuze in less than 1 second.

Operation:

The fuzes employ an oscillator, a Metal Oxide Semiconductor (MOS) binary divider, and a binary counter using metal-nitride-oxide-semiconductor (MNOS) memory devices that retains the time setting without the application of power.

In addition to providing the function signal as set into the fuze, the counter circuitry provides arming signals approximately 3.4 and 0.2 seconds before function time. The 0.2-second arming signal is used only for set times at less than 3.4 second. Either arm signal permits the firing capacitor to charge. The electronics using MOS and MNOS devices are fabricated on two integrated-circuit chips. The re-mainder of the electronics consists of two hybrid circuit packages and discrete parts. A reserve-type liquid electrolyte battery that is activated at gun launch powers the fuze during flight.

When a time fuze is correctly set using the M36 Fuze Setter, a display (consisting of light-emitting diodes) presents the time set on the switches. Failure in the fuze or setter will cause a display indicating error (E). If the fuze setter battery voltage becomes low, the display will show the letter L and the set time indicating that the setter batteries should be recharged at the earliest opportunity If the user wishes to interrogate (check) a fuze that has been previously set, he can move the MODE switch to the interrogate position and read the set time to the nearest 0.01 second. Interrogation does not change the fuze setting.

In the event PD action is desired, the fuze can be set for PD action as per fuze setter instruction.

The fuze can be reset repeatedly without damage and retains its last setting indefinitely.

Touching or shorting the series of nose rings on the fuze will not damage the fuze or change its setting.

The M587 fuze contains an electrical impact switch which becomes armed just prior to set time as well as a mechanical impact backup (the S&A slides forward to initiate the M55 stab detonator).

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Functioning:

The fuze as received will be in an unarmed condition, set for PD action. The S&A assembly is not armed and requires setback and spin upon firing to actuate. The battery ampule is activated upon setback; i.e., breaks and releases an electrolyte to form a battery to provide electrical energy to operate the timing mechanism, Prior to firing, the fuze is placed on the desired round, secured by using an M18 Fuze Wrench and then the desired time is set with the M36 setter. Upon firing, setback forces retract the setback pin in the S&A assembly and cause the power supply to activate by breaking the ampule and releasing the battery acid. The rotational spin imparted to the projectile; by the rifling of the weapon causes the electrolyte to move beyond the perimeter of its copper container into the battery cell stack and within 5-50 milliseconds full battery power will be achieved. The rotation also causes the spin detents within the S&A to open, allowing the gear train to run and arm, The S&A will be armed at 400-800 calibers of travel, depending upon weapon and zone of fire. At approximately 3.5 seconds prior to set time, the electrical PD impact switch becomes armed. If the M587 fuze does not function at set time, the S&A mechanism moves forward during impact and functions the M55 stab detonator when it strikes a fixed firing pin.

Tabulated Data:

Type	Electronic Time (ET)
Weight	1.81 lb
Length:	
Visible	3.758 in.
Overall	5.968 in.
Thread size	2.00 - 12 UNS-1A
Assembly Dwg. No.	11711435
Arming Distance	400-800 calibers

Temperature Limits:

Firing:	
Lower limit:	
Fuze	-40°F (-40°C)
Setter	-40°F (-40°C)
Upper limit:	
Fuze	+145°F (+63°C)
Setter	+145°F (+63°C)
Storage:	
Fuze:	
Lower limit	-65°F (-54°C) (for periods of not more than 3 days)
Upper limit	+160°F (+71.1°C) (for periods of not more than 4 hr/day)
M36 Setter:	
Lower limit	-65°F (-54°C)
Upper limit	+160°F (+71.1°C)
For Charging	
Fuze Setter:	
Lower limit	-40°F (-40°C)
Upper limit	+145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Explosive Components:

Electric microdetonator:	
Explosive	30 mg total
M55 stab detonator:	
Explosive	85 mg total
Prime mix NOL #130	15 mg
Lead azide RD 1300	51 mg
RDX	19 mg
S&A lead charge (PBXN-5):	
Explosive	134 mg total
Output lead charge (PBXN-5):	
Explosive	182 mg total
Booster pellet (Comp A-5):	
Explosive	27 g total
Packing	8 Fuzes in metal containers; 2 containers in wire-bound box
*Packing Box:	
Weight	55.8 lb
Dimensions	14-5/8 in. x 12-13/16 in. x 9-1/8 in.
Cube	1.04 cu ft

NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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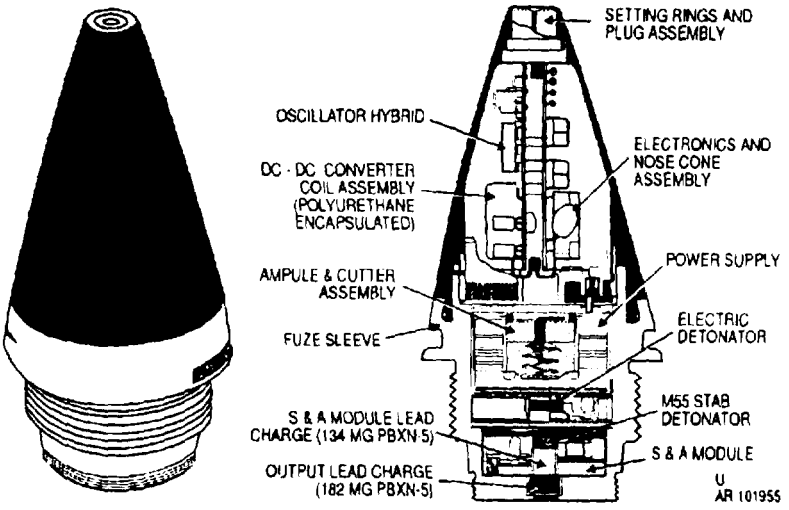
FUZE, ELECTRONIC TIME: M724



Type Classification:

Std MSR 03796007.

Use:

The electronic time fuze M724 is used with base ejection type artillery projectiles where an initiation of an ejection charge is required. It is used predominately with the Improved Conventional Munitions. The projectile must have a standard 2-inch thread fuze well cavity.

Description:

This electronic time fuze has a black anodized aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity.

The fuze nose has a series of rings. This is the means by which the fuze is set, A series of ins within the fuze setter makes contact with the series of rings to impart the electrical impulses which set the desired time. The fuze will provide setting time from 0.2 to 200 seconds in increments of tenths of a second. The setting of the fuze is accomplished by use of the M36 fuze setter which is a hand-held, battery-powered electronic device that time- sets the fuze in less than 1 second.

The M724 fuze contains an electrical impact switch which becomes armed just prior to set time,

Operation:

The fuzes employ an oscillator, a Metal Oxide Semiconductor (MOS) binary divider, and a binary counter using metal-nitride-oxide-semiconductor (MNOS) memory devices that retains the time setting without the application of power.

In addition to providing the functional signal as set into the fuze, the counter circuitry provides arming signals approximately 3.4 and 0.2 seconds before function time. The 0.2-second arming signal is used only for set times at less than 3.4 second, Either arm signal permits the firing capacitor to charge. The electronics using MOS and MNOS devices are fabricated on two integrated-circuit chips, The remainder of the electronics consists of 2 hybrid circuit packages and discrete parts, A reserve-type liquid electrolyte battery that is activated at gun launch powers the fuze during flight.

When a time fuze is correctly set using the M36 Fuze Setter, a display (consisting of light-emitting diodes) presents the time set on the switches, Failure in the fuze or setter will cause a display indicating error (E), If the fuze setter battery voltage becomes low, the display will show the letter L and the set time indicating that the setter batteries should be recharged at the earliest opportunity. If the user wishes to check a fuze that has been previously set, the MODE switch can be moved to the interrogate position and read the set time to the nearest 0.01 second, Interrogation does not change the fuze setting.

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In the event PD action is desired, the fuze can be set for PD action as per fuze setter instruction.

The fuze can be reset repeatedly without damage and retains its last setting indefinitely.

Touching or shorting the series of nose rings on the fuze will not damage the fuze or change its setting.

Functioning:

The fuze as received will be in an unarmed condition, set for PD action. The S&A assembly is not armed and requires setback and spin upon firing to actuate. The battery ampoule is activated upon setback, i.e., breaks and releases an electrolyte to form a battery to provide electrical energy to operate the timing mechanism.

The fuze is placed on the desired round, secured by using an M18 Fuze Wrench and then the desired time is set with the M36 setter.

Upon firing, setback forces retract the setback pin in the S&A assembly and cause the power supply to activate by breaking the ampoule and releasing the battery acid.

The rotational s in imparted to the projectile by the rifling of the weapon causes the electrolyte to move beyond the perimeter of its copper container into the battery cell stack and within 5 - 50 milliseconds full battery power will be achieved, The rotation also causes the spin detents within the S&A to open, allowing the gear train to run and arm. The S&A will be armed at 400- 800 calibers of travel, depending upon weapon and zone of fire. At approximately 3.5 seconds prior to set time, the electrical PD impact switch becomes armed.

The M724 fuze does not have a mechanical PD backup and, therefore, will not provide backup function upon impact. This is so designed to prevent contamination of an area with hazardous munitions which may later be occupied by friendly troops. This assumes that failure of the electronic time function will also cause failure of the electrical PD mechanism. The M724 contains the electric PD mode to enable it to be used as a spotting round fuze when coupled with a cargo round with a shaped charge adapter for munitions detonation in lieu of the normal base ejection.

Tabulated Data:

Type	Electronic Time (ET)
Weight	1.69 lb
Length:	
Visible	3.758 in.
Overall	5.268 in.
Thread size	2.00-12 UNS-1A
Assembly Dwg No.	11711268
Arming distance	400-800 calibers

Temperature Limits:

Firing - Fuze:	
Lower limit	-40°F (-40°C)
Upper limit	+145 °F (+71.1°C)
Storage - Fuze:	
Lower limit	-65°F (-54°C) (for periods of not more than 3 days)
Upper limit	+160°F (+71.1°C) (for periods of not more than 4 hr/day)
Storage - M36 Setter:	
Lower limit	-65°F (-54°C)
Upper limit	+160°F (+71.1°C)
Charging - M36 Setter:	
Lower limit	*-40°F (-40°C)
Upper limit	+145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Explosive Components:

Electric Microdetonator	
Explosive	30 mg total
M55 Stab Detonator:	
Explosive	85 mg total
Prime Mix NOL #130	15 mg
Lead Azide RD 1300	51 mg
RDX	19 mg
S&A Lead Charge (PBXN -5)	
Explosive	134 mg
Output Lead Charge (PBXN-5)	
Explosive	182 mg

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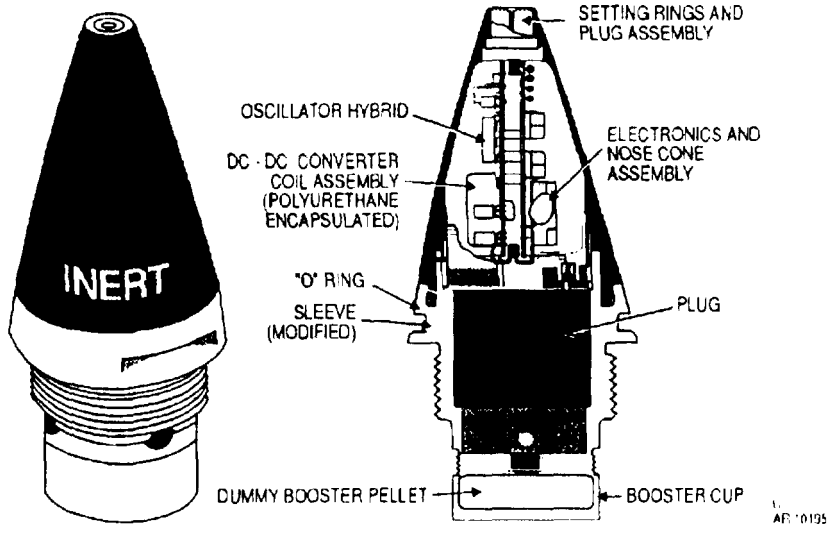
FUZE, ELECTRONIC TIME: TRAINING, M744



Type Classification:

Std--MSR 03796007.

Use:

The inert training fuze M744 will be utilized as a training aid. The fuze is inert but electronically identical to M587 and M724 fuzes.

Description:

The inert electronic time fuze M744 comprises of a black anodizing aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity.

The fuze nose has a series of rings, This is the means by which the fuze is set. A series of pins within the fuze setter makes contact with the series of rings to impart the electrical impulses which set the desired time. The fuze will provide setting time from 0.2 to 200 seconds in increments of tenths of a second.

Since the M744 is inert, the booster pellet cup is a replica of the explosive. There is no safety and arming (S&A) device and a block of aluminum takes the place of a battery.

Functioning:

The M744 inert training fuze interacts with the M36 setter identically to either the M587 or M724 fuzes. The fuze setter is a hand-held battery powered electronic device that time sets the fuze in less than 1 second. It allows test setting and verification readout of the M744.

Tabulated Data:

Type	Electronic Time (ET) Training
Weight	1.81 lb
Length:	
Visible	3.758 in.
Overall	5.968 in.
Thread size	2.00-12 UNS-1A
Assembly Dwg. No.	11726806
Arming distance	400 - 800 calibers

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+145°F (+63°C)
Storage - Fuzes:	
Lower limit	-65°F (-54°C) (for periods of not more than 3 days)
Upper limit	+160°F (+71.1°C) (for periods of not more than 4 hr/day)

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Storage - M36 Setter:	
Lower limit	-65°F (-54°C)
Upper limit	+160°F (+71.1°C)
For Charging M36 Setter:	
Lower limit	*-40°F (-40°C)
Upper limit	+145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Packing	Eight fuzes in metal container; 3 containers in wirebound box
Packing box - Fuze:	
Weight	55.8 lb
Dimensions	14-5/8 x 12-23/16 x 9-1/8 in.
Cube	1.04
Carrying Case - Setter:	
Weight	25 lb 4 oz
Dimensions	12 x 13.36 x 6.09 in.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	N/A
DODAC	N/A

Explosive Components:

Not Applicable.

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CHAPTER 8

MISCELLANEOUS

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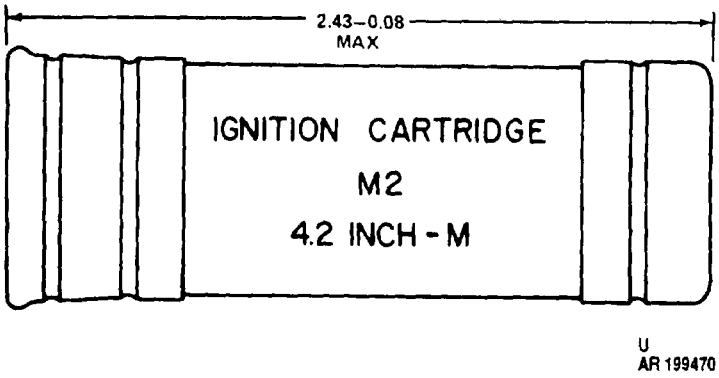
CARTRIDGE, IGNITION: M2, M2A1, & M2A2



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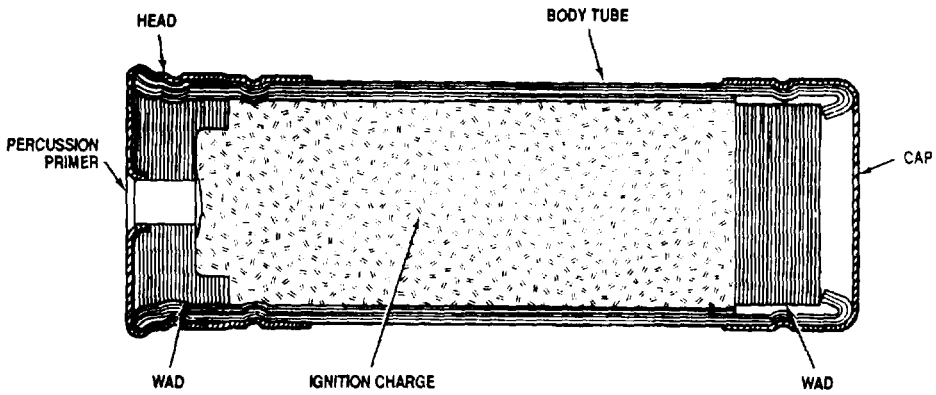

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AR 199469

Type Classification:

Use:

These cartridges are components of all 4.2-inch mortar cartridges. Ignition Cartridge M2 is used with Propelling Charges M6 and M36. Ignition Cartridge M2A is used with Propelling Charge M36A1. Ignition Cartridge M2A2, which has greater resistance to moisture and longer shelf life than M2A1, is used with Propelling Charge M36A1 and M36A2. Illuminating Cartridge M335A2 uses M2A2 only.

Description:

These cartridges are similar in external appearance to a commercial 12-gage shotgun cartridge. Each cartridge consists of an outer body tube of red cartridge paper construction, an inner body tube of green cartridge paper construction, a brass cap crimped over the front end, a brass head with a tin-plate liner crimped over the rear end, and a percussion primer inserted into the head at the cartridge base. The cylindrical cavity in the body tube contains one of two different types of ignition charges, depending on the cartridge model, Three layers of hard-pressed paper wadding in the front end of the body tube act to seal and hold the ignition charge in position. A hard-pressed convolute wound paper wad in the base of the body tube serves as a receptacle for the percussion primer and seals and holds the ignition charge in position.

Functioning:

The firing pin in the mortar tube base strikes the percussion primer in the base of the ignition cartridge, igniting the ignition charge, The flash from the burning ignition charge incinerates the body tube and ignites the propelling charge through the flash holes in the cartridge container.

Difference Between Models:

See Tabulated Data.

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Tabulated Data:

Complete round:	
Type	Ignition cartridge
Weight:	
M2	
M2A1, M2A2	
Length:	
M2	2.45-.05 in.
M2A1, M2A2	2.43-.08 in.
Color	Red w/black markings
Ignition charge:	
M2	Propellant, M9, Type II, 120.0 ± 2. 5 grains
Class and div dwg. No.	75-19-81
M2A1, M2A2	Black powder, Class 3, 170.0 ± 5 grains
Drawing No.	8863425-(M2A1) 9252205-(M2A2)
M2A2	Black powder, Class 3, 133.0 ± 5 grains
Drawing No.	8882287
Primer	Percussion

References:

TM 9-1300-251-20
TM 9-1015-215-10

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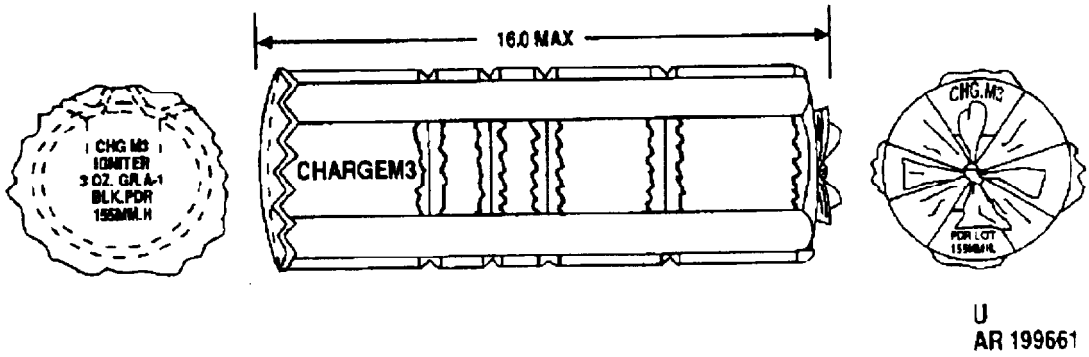
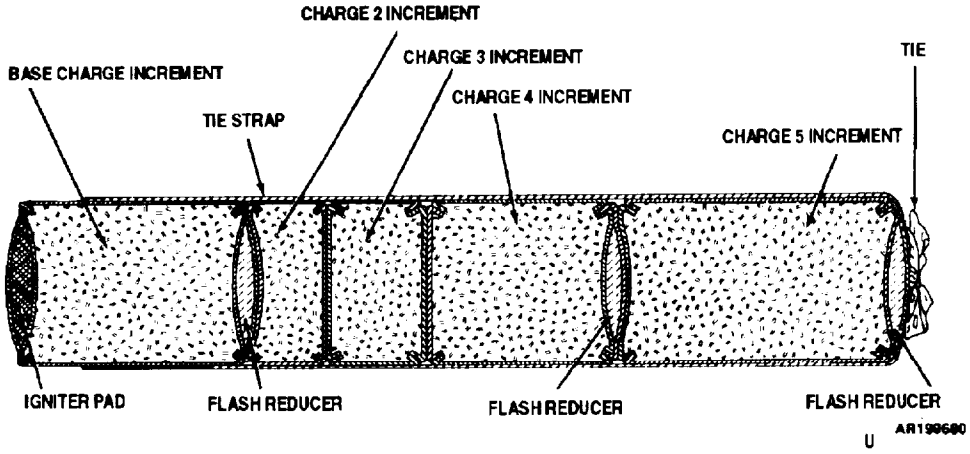
CHARGE, PROPELLING, 155-MILLIMETER: M3 SERIES





Type Classification:

M3A1 : Std AMCTC 4633 dtd 1966.
M3: Std AMCTC 4633 dtd 1966.

Use:

The M3 series propelling charges are green bag type designed for use in I55mm howitzers for firing in Zones 1 through 5.

Description

The full charge consists of approximately 5.50 pounds of propellant including a base charge and four unequal increments loaded in cloth bags. The hags are fastened together with four cloth straps sewn to the base and tied on top of Increment 5. Charge M3 is assembled. without flash reducer pads. Charge M3A1 includes 3 flash reducer pads containing potassium nitrate or potassium sulphate. A 2 ounce pad is assembled forward of the base charge and there are two l-ounce pads forward of Increments 4 and 5. The igniter charge of the M3A1 is 3.5 ounces of clean burning igniter (CBI) in a red cloth bag sewn to the rear of the base section. The igniter charge of the M3 is 3 ounces of black powder. The seams of the base charge section are inverted on the M3A1 only so that the edges of the cloth are inside to reduce residue after firing.

Functioning:

The primer ignites the igniter pad, and the igniter charge, in turn, ignites the propellant charge. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target or function point. The flash reducer pads serve to limit breech flare-back as well as muzzle flash and blast overpressure.

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Difference Between Models:

Model M3 does not include flash reducers. The igniter charge is 3 ounces of black powder instead of CBI. and the base seams are not inverted.

Tabulated Data:

Type	Green bag, separate loading
Weight	6.2 lb
Length	16 in.
Color	Green w/black markings
Propellant	Ml (5.6 lb explsive)
Cannon used with	M1, M1A1, M45. M126. M126A1, M185, M199

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not more than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)
*Packing	2 propelling charges in container Ml4
*Container:	
Weight	29.0 lb
Dimensions	33-3/4 x 6-3/8 x 6-3/8 in.
Cube	0.89 cu ft
Explosive per container	11.5 lb

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID CLASS B WITH CANNON PRIMERS AND IGNITERS
UNO serial number	0242
DODAC	1320-D540
Assembly Dwg. No.:	
M3A1	8887277
M3	8864405

Preparation For Firing:

No preparation is required other than adjusting the charge according to the firing zone.

Limitations:

Increments of green bag charges may not be mixed with white bag increments.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1025-200-12&P
TM 9-2350-311-10

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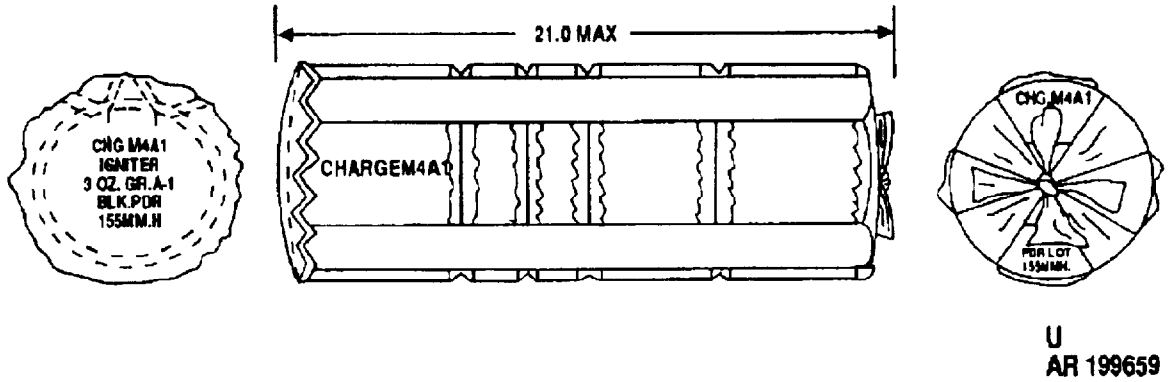
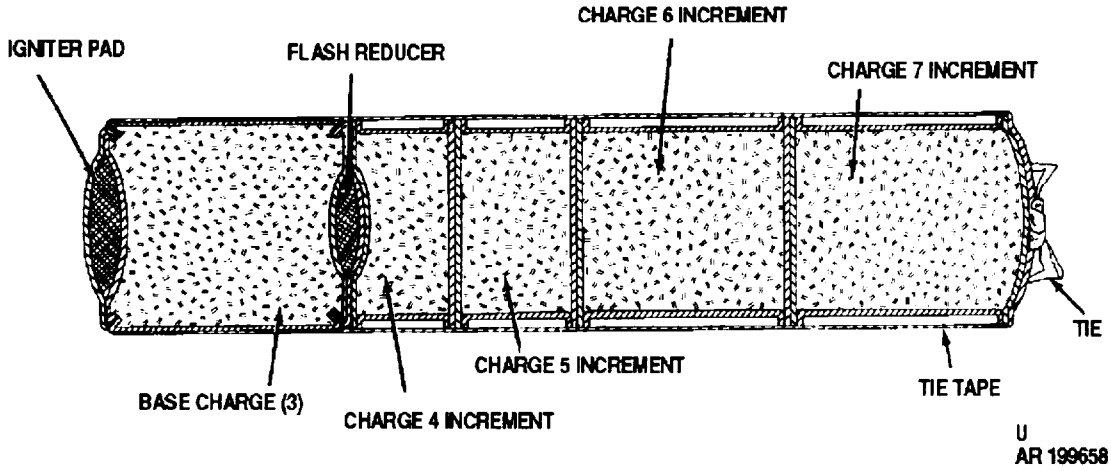
CHARGE, PROPELLING, 155-MILLIMETER: M4 SERIES





Type Classification:

M4A2: Std AMCTC 4633 dtd 1966.
M4A1: Std AMCTC 4633 dtd 1966.

Use:

This white bag propelling charge is used in 155mm howitzers for firing in Zones 3,4,5,6, and 7.

Description:

The total charge (M4A2 Prop. Charge) consists of 13 pounds of propellant and is divided between a base charge and four unequal increments loaded in white cloth bags. The increments are connected by four cloth tapes sewn to the base and tied on top of Increment 7. The igniter for Charge M4A2 is 3.5 ounces of clean burning igniter (CBI) in a red cloth pad sewn to the bottom of the base charge. A flash reducer pad containing one ounce of potassium nitrate or potassium sulphate is assembled at the front end of the base increment (Increment 3). The seams in the base pad are inverted so that the edges of the cloth are inward to reduce residue after firing.

Functioning:

When the weapon is fired, the primer ignites the igniter charge, and the igniter charge ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The flash reducer pads serve to limit breech flareback as well as muzzle flash and blast overpressure.

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Difference Between Models.

Model M4A1 is similar to Model M4A2 except that the igniter charge is 3.0 ounces of black powder instead of CBI, the base charge seams are not inverted, and the charge does not include a flash reducer. Flash Reducer M2 may be used with Charge M4A1 when required, but is a separate item of issue.

Tabulated Data:

Complete round:	
Type	Separate loading, white bag
Weight	14.0 lb
Length	21.0 in, max
Color	White w/black markings
Cannon used with	M1, M1A1, M45, M126, M126A1, M185, M199
Propellant M1	(13.4 lb explosive)

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not more than 3 days
Upper limit	+141°F (for periods not more than 4 hr/day
*Packing	1 charge in metal container M13
*Container:	
Weight	30.5 lb
Dimensions	27-3/4 x 7-3/8 x 7-3/8 in
Cube	0.87 cu ft
Explosive per container	13.7 lb

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UN0 serial number	0242
Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class:	
M4A2	B
M4A1	B
DOT designation:	
M4A2	PROPELLANT EXPLOSIVES SOLID CLASS B
M4A1	PROPELLANT EXPLOSIVES SOLID CLASS B
DODAC	1320-D541
Assembly Dwg. No.:	
M4A2	9207624
M4A1	71-9-180

Preparation For Firing:

No preparation is required except adjustment of the charge according to the firing zone intended.

Limitations:

Erratic range results may be expected when firing M4 series charge in Zones 3 and 4, so Green Bag M3 series charge should be used for those zones when available.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1025-200-12&P
TM 9-2350-311-10

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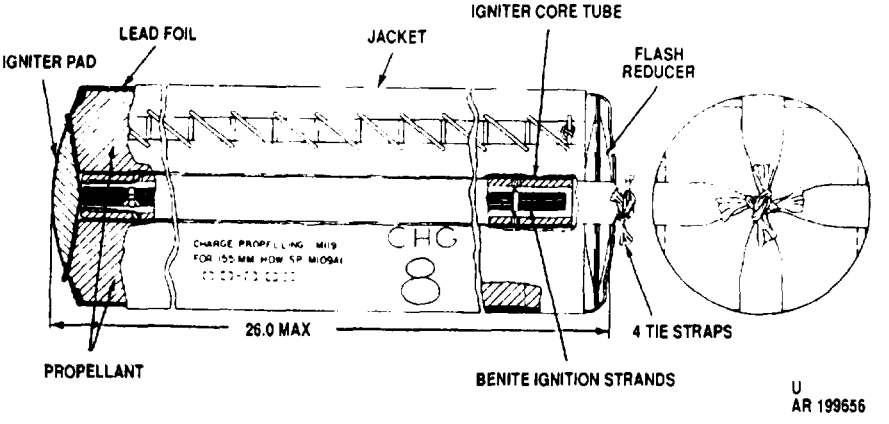
CHARGE, PROPELLING, 155-MILLIMETER: M4SERIES



Type Classification:

M119 Std AMCTC 8204, dtd 1971.
M119A1 Std MSR 12776011.

Use:

This propelling charge is designated Zone 8 and extends the range of 155mm Howitzer M109A1, M109A2/A3, and M198.

Description:

Propelling Charge Ml19/Ml19Al is a single-increment white bag charge. A perforated igniter core tube extends through the center of the propellant. The 26-inch length of the charge precludes use in any other weapon than the long tube howitzer. The forward end is sheathed in lead foil and also carries a one pound flash reducer pad of potassium sulfate. A circular igniter pad of red cloth containing two ounces of clean burning igniter (CBI) is sewn to the base of the rayon propellant bag.

Functioning:

When the weapon is fired, the primer ignites the CBI in the igniter pad at the base of the propelling charge, The igniter flashes through the perforations in the igniter core tube to ignite the propellant. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. Blast overpressure and muzzle flash of the firing are reduced by the flash reducer included in the charge. The lead foil sheath serves to prevent copper build-up (coppering) in the weapon.

Difference Between Models:

The basic difference between the M119 and Ml 19A1 models is that the M 119A1 has a donut shaped flash reducer that precludes non-ignition of the rocket motor of the M549/M549Al Projectile, The M119A1 has a new tnolded center core igniter tube; a 360 degree basic igniter seam lacing jacket. A pull strap has also been added to the M119A1 charge that provides easier removal from the metal container. This pull strap must be removed from the charge before loading into the weapon tube.

Tabulated Data:

M119 (M119A1) Charge:

Type	White bag, separate loading
Weight	23 lb (10 kg)
Length	26 in. (66 cm)
Color	White w/black markings
Cannon used with	M185 (M109A1/A2/A3; M199 (Ml98)
Propellant	M6, 20.5 lb (9.3 kg)
Primer	M82
Performance (complete round):	
Maximum range	(18,692 yd) (17,092m)
Muzzle velocity	2245 fps (684 mps)

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Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-65°F (-54°C) (for periods not more than 3 days)
Upper limit	+160°F (71°C) (for periods not more than 3 hr/day)
*Packing	1 propelling charge in palletized metal container PA37A1
*Propelling charge container:	
Weight	70 lb (32°C)
Dimensions	29-1/4 x 8-1/4 x 8-1/4 in. (74.30 x 21.00 x 21.00 cm)
Cube	1.2 cu ft (0.03 cu m)

NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID CLASS B
DODAC	1320-D533
Assembly Dwg. No.	9226436 (M119); 9325852 (M119A1)
Container Dwg. No.	9234357

Preparation For Firing:

No preparation is required.

Limitations:

M119 not to be fired with M549/M549A1 Projectile.

Use only the M119A1 with the M549/M549A1 Projectile.

The M119 (M119A1) propelling charge must not be stored or shipped in the vertical position due to damage that could be caused to the igniter core.

References:

TM 9-1300-251-20
TM 9-2350-311-10

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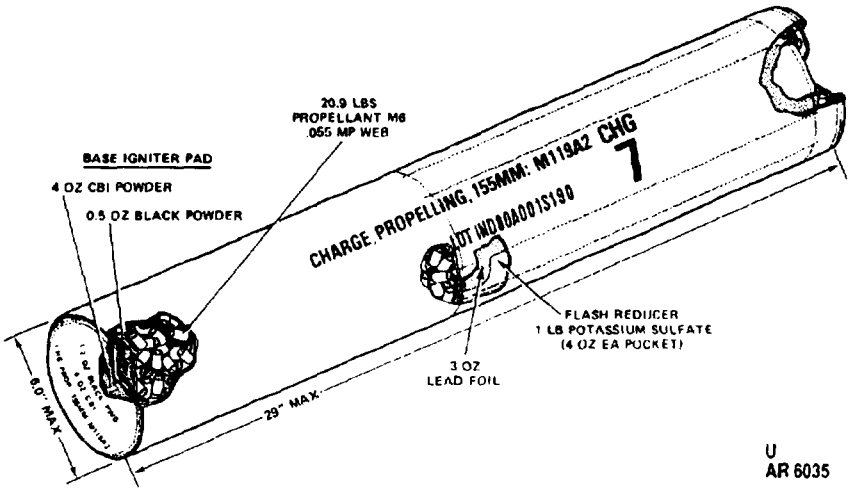
CHARGE, PROPELLING 155 MM: M119A2



Type Classification:

M119A2 STD. MSR 09806009.

Use:

This propelling charge is a Zone 7 red bag charge for firing in 155mm Howitzers containing M185 and M199 cannon tubes.

Description:

The M119A2 Propelling Charge is a single increment red bag charge which contains a base igniter pad with 4 ounces CBI powder and a center spot of 0.5 ounces of black powder. The charge is approximately 29 inches long by 6 inches in diameter and contains 20,9 pounds of M6 propellant. The forward end of the charge has a 3 ounces lead foil liner and four pockets sewn longitudinally to the circumference, Each of the four pockets contains 4 ounces of potassium sulfate to act as a flash reducer.

Functioning:

Upon firing the weapon, a flash from the primer ignites the CBI powder in the base igniter pad which ignites the black powder spot, The burning of the CBI and black powder spot in turn ignites the propellant, The burning propellant generates rapidly expanding gases which propel the projectile through the barrel and up to the velocity required to reach the target, The flash reducer functions to reduce blast overpressure and flash at the muzzle of the weapon. The lead foil liner serves to prevent copper build-up (coppering) in the weapon.

Difference Between Models:

The M119A2 is base ignited and does not contain a center igniter core and tube as in the case of the M119 (M119A1), Although this charge is a Zone 7 it can be used interchangeably with the M119, M119A1 Zone 8 charges and like these charges the Ml19A2 is to be used in the M185 and M199 gun tubes only. The M119A2 does not have the outer lacing jacket that is used to wrap the M119 and M119A1 propelling charge.

Tabulated Data:

M119A2 Charge:

Type	Red bag, separate loading
Weight	23.5 lb (10.7 kg)
Length	29 in. (74 cm)
Color	Red w/black markings
Cannon used with	M185 (M109A1/A2/A3) M199 (M198)
Propellant	M6, 20.9 lb (9.5 kg)
Primer	M82
Flash reducer	Potassium Sulfate, 1 lb (0.5 kg)
Igniter	CBI 4 oz (113g), black powder 0.5 oz (14.2 g)

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Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52 °C)
Storage:	
Lower limit	-65°F (-53.8°C) (for periods not more than 3 days)
Upper limit	+160°F (+71.1°C) (for periods not more than 4 hr/day)
*Packing	1 propelling charge in metal container PA37A1
*Propelling charge container:	
Weight	44 lb (20 kg)
Dimensions	32 3/4 in. long x 8 13/32 in. dia (83.19 cm x 21.35 cm)
Cube	1.3 cu ft (0.04 cu m)

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Storage class/SCG	1.3 C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVES SOLID-CLASS B
DODAC	1320-D533
Assembly Dwg. No.	9333954
Container Dwg. No.	9333957

Preparation For Firing:

Igniter protector cap held in place by tie strap must be removed before firing. Tie strap is marked "Remove Before Firing."

Limitations:

N/A.

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-311-10
TM 9-1025-211-10

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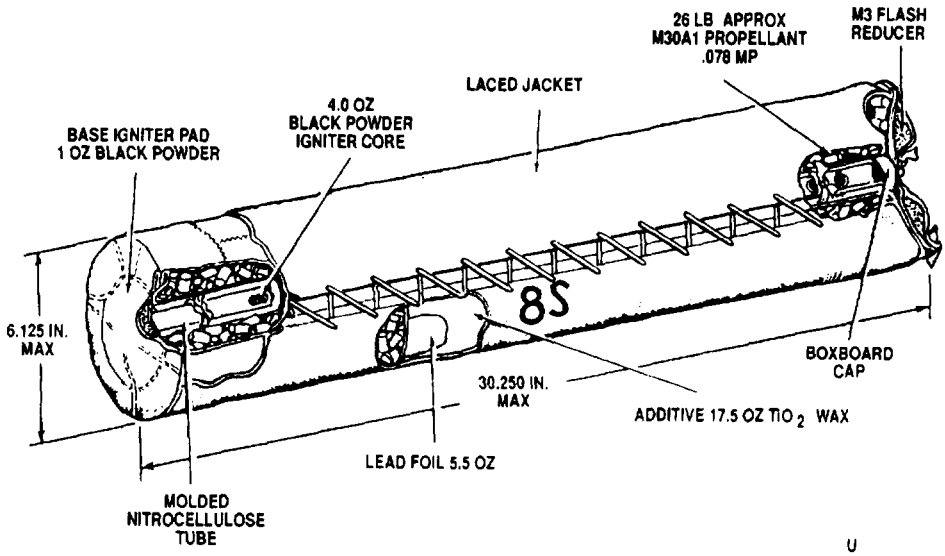
CHARGE, PROPELLING, 155-MILLIMETER: M203



Type Classification:

Con MSR 06856006

Use:

The M203 is a Zone 8 S charge designed to supplement the standard M3, M4, and M119 series charges and to provide extended range for the 155mm Howitzer M198.

Description:

The M203 Propelling Charge is a single increment, red bag charge, approximately 30-1/4 inches long. The charge contains approximately 26 pounds of the high energy, M30A1 propellant in a cloth bag. A red cloth igniter pad containing 1 ounce of black powder is sewn to the base of the charge. A central ignition core extends through the center of the charge for almost its entire length. This ignition core consists of a nitrocellulose paper tube containing a bag of black powder which is sewn to the base igniter. A liner consisting of a cloth side impregnated with titanium dioxide and wax, and a lead side lines the forward end of the charge. Four tie straps sewn to the base of the charge run the length of the charge and are tied to the forward end of the charge, A donut shaped flash reducer is inserted under the tie straps at the forward end of' the charge. A cylindrical jacket is placed over the charge length and tightly laced. This lacing jacket serves to provide necessary rigidity and structural stability of the assembled charge, and serves to differentiate the 8S from the Ml19/Ml19Al Zone 8 charge.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge. Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target, The flash reducer functions to reduce blast overpressure and flash at the muzzle of the weapon.

Tabulated Data:

M203 Charge:

Type	Red bag, separate loading
Weight	26 lb (11.8 kg)
Length	30-1/4 in. (76.84 cm)
Color	Red w/black markings
Cannon used with	M199 (M198) system

Propellant:

M30Al	26 lb (11.8 kg)
Primer	M82 (only)
Performance	Zone 8 S

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Temperature Limits:

Firing:	
Lower limit	-50°F (-46°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62C°) (for periods not more than 3 days)
Upper limit	+160°F (+71°C) (for periods not more that 4 hr/day)
Packing	1 propelling charge in metal container PA68
Propelling charge containers:	
Weight	46 lb (21 kg)
Dimensions	38 x 8-13/32 x 8-13/32 in. (96.52 x 21.35 x 21.35 cm)
Cube	1.55 cu ft (0.04 cu m)

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID CLASS B
DODAC	1320-D532
Assembly Dwg. No.	9281897 (M203)
Container Dwg. No.	9293303 (M203)

Preparation For Firing:

No preparation is required.

Limitations:

The M203 propelling charge must not be stored or shipped in the vertical position due to damage that could be caused to the igniter core.

References:

TM 9-1025-211-10
TM 9-1300-251-20

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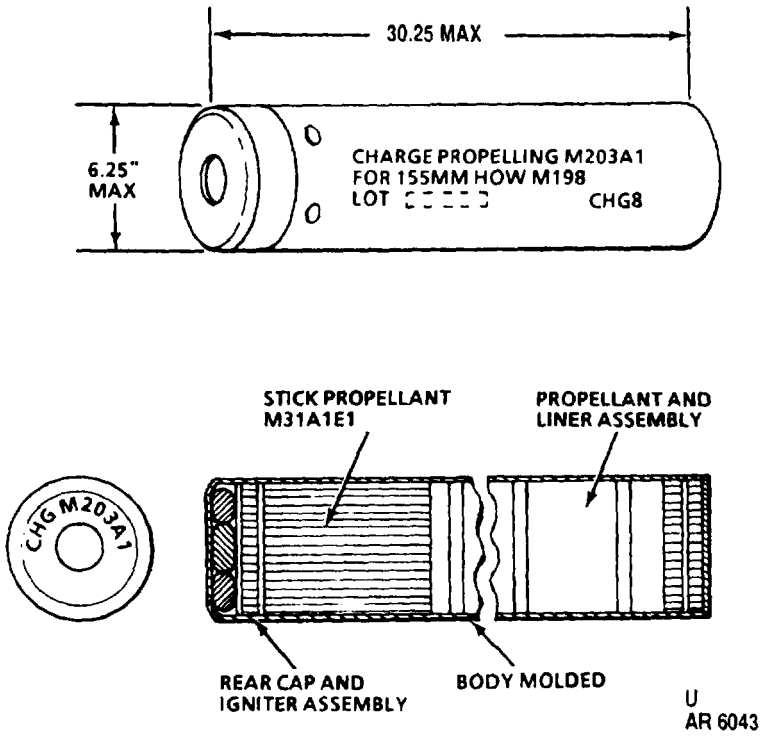
CHARGE, PROPELLING, 155 MM: M203A1



Type Classification:

STD MSR 06856006.

Use:

The M203A1 like the M203 is a Zone 8S charge designed to supplement the standard M3, M4 series, M119, M119A1, and M119A2 charges and to provide extended range for the long-tube 155mm Howitzer M198.

Description:

The M203A1 propelling charge is a single increment base ignited charge approximately 30¼ inches long. The charge consists of approximately 28 pounds of M31A1E1 stick propellant and a cloth igniter base pad encased in rigid combustible cartridge case end cap. The cloth igniter base pad contains 0.7 ounces of black powder and 1.0 ounce of CBI. The combustible cartridge case consists of nitrocellulose impregnated kraft paper, a stabilizer, a resin binder, and a wear-reducing additive. A liner containing a lead foil decoppering agent and wear-reducing additive is assembled around the forward end of the propellant bundle inside the combustible case.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the propelling charge. Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target.

Difference Between Models:

The M203A1 Propelling Charge like the M203 is a charge 8S Propelling Charge developed for extended range in long-tube (M198) 155mm howitzers, This charge consists of one increment of stick propellant and a base igniter pad encased in a full length rigid combustible cartridge case and end cap. The charge also contains a wear-reducing additive and a lead foil decoppering agent. The basic M203 charge is a red bag charge with center core ignition and granular propellant. The M203A1 charge is cooler burning which results in increased cannon tube life and a reduction in flash and blast.

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Tabulated Data:

Type	Combustible case, separate loading
Weight	31 lb
Length	30-1/4 in.
Color	Neutral w/black markings
Cannon used with	M199 (M198 system) (only)
Propellant:	
M31A1E1	28 lb
Primer	M82 (only)
Performance	Zone 8S

Temperature Limits:

Firing:	
Lower limit	-50°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not to exceed 3 days)
Upper limit	+160°F (for periods not to exceed 4 hr/day)
Packing	1 propelling charge in metal container PA103
Propelling charge containers:	
Weight	20 lb
Dimensions	38 x 8-13/32 x 8-13/32in
Cube	1.55 cu ft

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID-CLASS B
DODAC	1320-D532
Assembly Dwg. No.	9345103
Container Dwg. No.	9354642
NSN	1320-01-202-8938

Preparation For Firing:

No preparation is required.

References:

TM 9-1025-211-10
TM 9-1300-251-20

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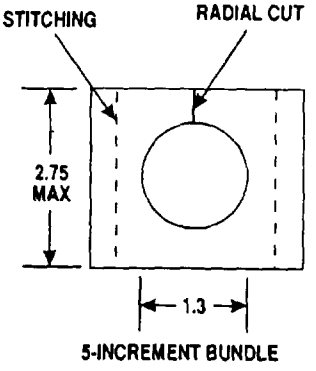
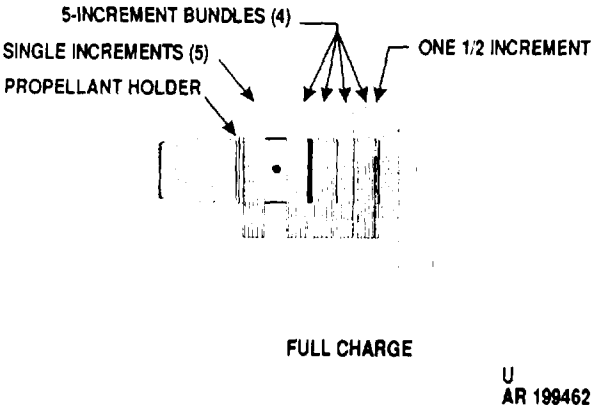
CHARGE, PROPELLING, 4. 2-INCH: M6





Type Classification:

Use:

This charge is a component of Smoke Cartridges M2 and M2A1, Gas Cartridges M2 and M2A1, and High Explosive Cartridges M3 and M3A1.

Description:

A full charge consists of 25-1/2 increments of M8 sheet propellant arranged in the following order: one 1/2 increment, four 5 increment bundles, and five single increments. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing tables. The method of securing the increments to the cartridge container varies among the cartridges, but each method involves the use of a wire propellant holder in front of or behind the increments.

Functioning:

The flash from the detonation of Ignition Cartridge M2 passes through the vents in the cartridge container, providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant	M8
Weight (full charge)	0.60 lb
Used with ignition cartridge	M2
Drawing number	71-12-27

Limitations:

To avoid excessive pressure which could result in damage to materiel and injury to personnel, charges must be fired at or above the following temperatures:

23-25-1/2 increments	+60°F
20-22-1/2 increments	+20°F
17-19-1/2 increments	0°F
5-16-1/2 increments	-40ºF

When using Cartridges M2, M2Al, M3, M3A1, M328, M329B1 and M335 assembled without cartridge container extensions.

References:

TM 9-1015-215-10
TM 9-1300-251-20

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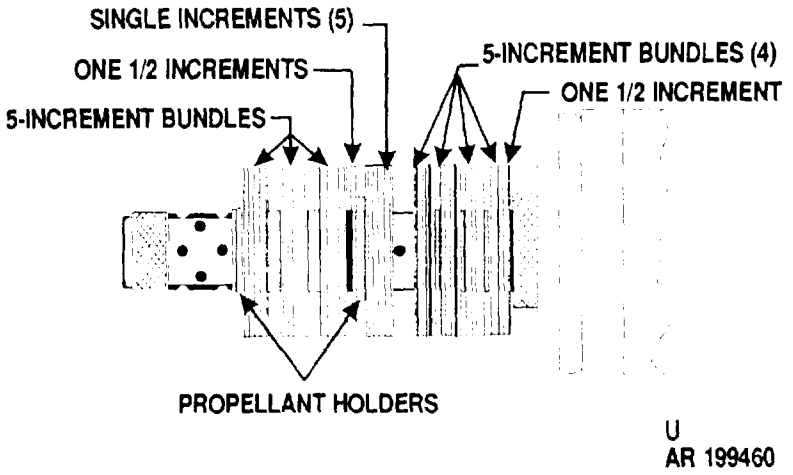
CHARGE, PROPELLING, 4.2-INCH: M36



Type Classification:

Use:

This charge is a component of Smoke Cartridge M328, High Explosive Cartridge M329, and Illuminating Cartridge M335.

Description:

A full charge consists of 41 increments of M8 sheet propellant arranged in the following order: one 1/2 increment, four 5 increment bundles, five single increments, one 1/2 increment, and three 5 increment bundles. This full charge is assembled on the cartridge as issued, Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts. Two wire holders are used to secure the increments to the cartridge container and extension. The extension must be used with more than 25-1/2 increments, and must be removed when firing with less than 25-1/2 increments. Removal of the extension requires relocation of the ignition cartridge in the cartridge container.

Functioning:

When used at any charge from 25-1/2 increments to full charge, the flash from the detonation of the Ignition Cartridge M2 passes through the vents in the cartridge container extension providing indirect ignition of the propelling charge. At charges below 25-1/2 increments, the extension is not used, and the flash from the ignition cartridge passes through the vents in the cartridge container providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant	M8
Weight (full charge)	0.60 lb
Used with ignition cartridge	M2
Drawing number	8797836

Limitations:

When firing cartridges M2, M2A1, M3, M3A1, M328, M329B1, M335 at a charge below 25-1/2 increments the cartridge container extension must be removed, and the ignition cartridge relocated in the cartridge container. When the following charges are assembled without the cartridge container extension, they will be fired at or above the temperatures listed.

23-25-1/2 increments	+60°F
20-22-1/2 increments	+20°F
17-19-1/2 increments	0°F
5-16-1/2 increments	-40°F

Failure to observe these limitations may result in excessive pressure causing damage to materiel and injury to personnel.

References:

TM 9-1015-215-10
TM 9-1300-251-20
TM 9-1320-241-12

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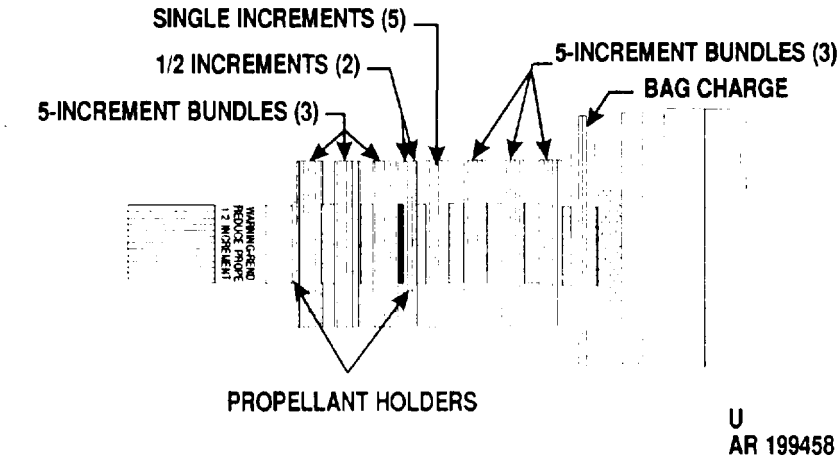
CHARGE, PROPELLING, 4.2-INCH: M36A1



Type Classification:

Use:

This charge is a component of Smoke Cartridge M328A1, High Explosive Cartridge M329A1, Illuminating Cartridges M335A1 and M335A2 and Tactical CS Cartridge M630.

Description:

A full charge consists of 36 increments of M8 sheet propellant and a doughnut-shaped bag of M9 flake propellant arranged in the following order: one bag charge, three 5 increment bundles, five single increments, two 1/2 increments, and three 5 increment bundles. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts, but the bag charge will not be removed at any time. Two wire holders are used to secure the increments to the cartridge container and extension, Removal of the extension when firing at reduced charge does not require relocation of the ignition cartridge.

Functioning:

The flash from the detonation of the Ignition Cartridge M2A1 or M2A2 passes through the vents in the cartridge container, providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant	M8 and M9
Weight (full charge)	0.60 lb
Used with ignition cartridge	M2A1, M2A2
Drawing number	8863617

Limitations:

The bag charge of M9 propellant will not be removed at any time. When firing at a charge below 25-1/2 increments, remove the cartridge container extension. The ignition cartridge does not require repositioning.

References:

TM 9-1015-215-10
TM 9-1300-251-20
TM 9-1320-241-12

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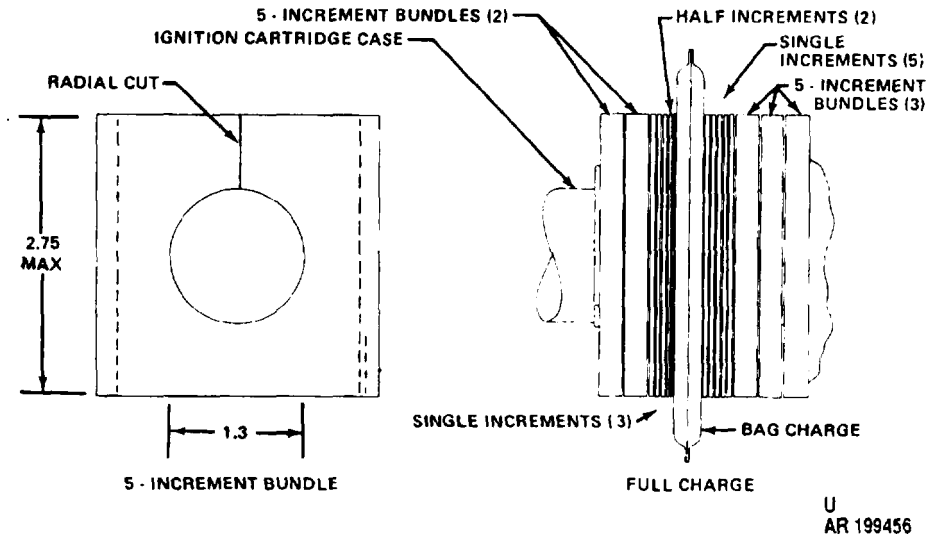
CHARGE, PROPELLING, 4.2-INCH: M36A2



Type Classification:

Use:

This charge is a component of High Explosive Cartridge M329A2.

Description:

A full charge consists of 34 increments of M8 sheet propellant and a doughnut shaped bag of M9 flake propellant arranged in the following manner: three 5 increment bundles, five single increments, one bag charge, two 1/2 increments, three single increments, and two 5 increment bundles. This full charge is assembled on the cartridge as issued, Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts, but the bag charge will not be removed at any time.

Tabulated Data:

Type propellant	M8 and M9
Weight (full charge)	0.60 lb
Used with cartridge	M2A2
Drawing number	9244177

Limitations:

The bag charge of M9 propellant will not be removed at any time.

References:

TM 9-1015-215-10
TM 9-1300-251-20
TM 9-1320-241-12

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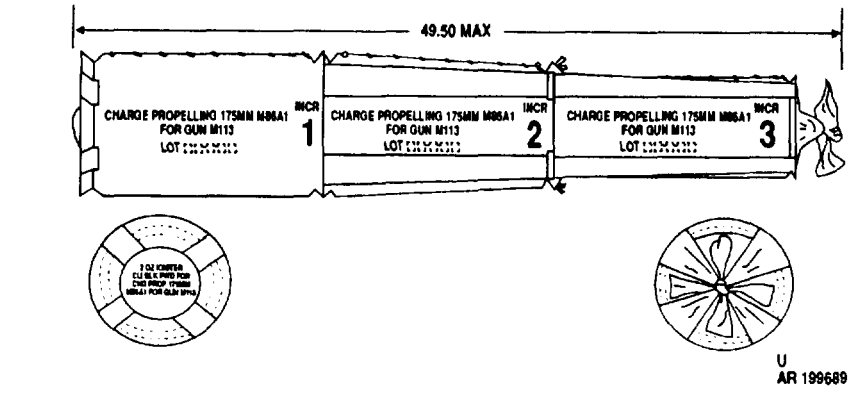
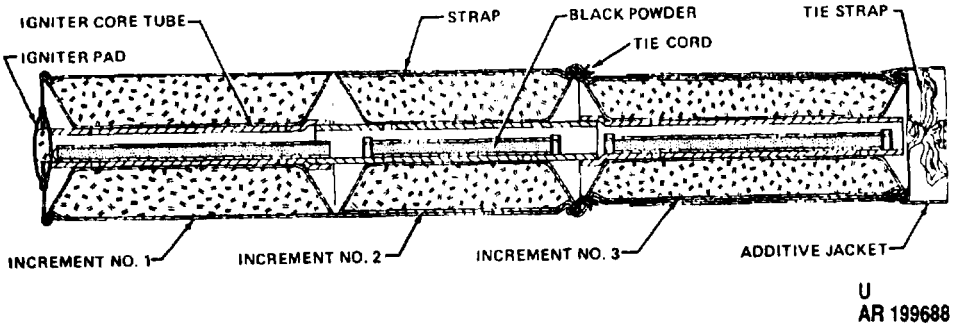
CHARGE PROPELLING, 175-MILLIMETER: M86 SERIES





Type Classification:

Std AMCTC 5851 dtd 1968.

Use:

M86 series propelling charges are used in the 175MM M107 Self-Propelled Weapon System.

Description:

(Ancillary items used only with these charges are the Ml additive jacket and the M5 flash reducer-described below.)

The charge is an adjustable three-increment white bag type. It is approximately 49-1/2 inches long and contains a total of 55 pounds of multiperforated Propellant M6 in acrylic viscose-rayon bags. The bags are tied together by four tying straps attached to the top of Increment 1 and knotted on top of Increment No. 3. The tying straps are reinforced by cord tied tightly around the junction of Increments No. 2 and 3. Each propelling charge has an igniter core assembly extending through the center of the charge, The core assembly consists of three rigid polyurethane tubes containing bagged igniter cores of black powder. The igniter tubes for Zones 1 and 3 contain bell shaped ends which assemble over the ends of the igniter tube in Increment 2. A red cloth igniter pad, filled with black powder, is sewn to the base of Increment 1. The igniter core for Increment 1 is sewn to the igniter base pad and is loose in the Increment 1 igniter tube, The cores for Increments 2 and 3 are tied inside the igniter tubes for these increments, An igniter protective cap is placed over the igniter base pad for protection in shipment and storage. An additive jacket is issued separately for assembly over Increment 3 when firing full charge. (The majority of M86A2 charges are shipped with the additive jacket already assembled over Increment 3,) All charges are packed with an M82 percussion primer. An M5 flush reducer is also issued separately to be assembled around the junction of Increments 2 & 3 on certain M86A1 charges, It is designed to reduce excessive blast and flash effects associated with certain lots of Propelling Charge M86A1. The flash reducer, which contains 16 ounces of potassium sulphate, is an apron-type cloth bag designed to be tied around the forward end of Increment No, 2 with its leading edge at the junction of Increment No. 2 and 3.

NOTE

Use Flash Reducer XM5 with Lots IND 1-19 through IND 1-77 of Propelling Charge M86AI when fired at Zone 3 only.

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Bore-wear-reducing Additive Jacket Ml is used with Increment No, 3 when firing M86 Series Propelling Charges at full charge, It consists of two 10-1/2 x 18 x l/8-inch cloth-backed sheets of additive mixture stitched together. The additive mixture is composed of 47 percent titanium dioxide and 53 percent wax. The cloth backing, which is bonded to and overlaps the sheets of additive mixture, is stitched to an unbended tough plastic film casing which serves as a jacket liner. When compressed along the seams, the jacket arches to form a cylinder with a diameter of approximately 7-1/2 inches.

NOTE

- If the additive mixture is cracked or the plastic sheet is ripped, the additive jacket is still acceptable for use. Use the additive jacket over Increment No. 3 only. Use of the jacket on Increments No. 1 and 2 is ineffective.
- In a tactical situation, if additive jackets are not available and the mission is in jeopardy, a maximum of 100 rounds per tube may be fired at full charge without affecting current condemnation limits of the tube,

Functioning:

When the primer is initiated in the breechblock of the gun, flash ignites the black powder in the igniter pad. The flame proceeds through the powder in the igniter tubes to accomplish uniform ignition of the propelling charge through all three increments. The burning propellant generates rapidly expanding gases to propel the projectile through the gun tube at the velocity required to reach the target. When the additive jacket is employed for full charge firing, the mixture of titanium dioxide and wax in the cloth backing serves to reduce bore wear at the origin of rifling in the cannon. When the M5 flash reducer is employed for full charge firing, the potassium sulfate serves to reduce the amount of blast and flash which occurs.

Difference Between Models:

The M86 has a 4 ounce igniter pad and all 3 tubes are perforated. The M86A1 has a 2 ounce igniter pad and an unperforated Increment No. 1 tube. The M86A2 is identical to the M86A1 except for the igniter tubes, which are reinforced with dacron scrim. Early production M86A2's are packed without additive jackets.

Tabulated Data:

Propelling Charge:	
Type	White bag separate loaded propelling charge
Weight	58.0 lb
Length	49.5 in. (max.)
Diameter	8.0 in. (max.)
Cannon (Weapon) used with--	M113, M113A1 (M107)
Propellant:	
Composition	M6
Grain type	7 perforated cylinder, L/D = 2. 35
Weight	55 lb
Web	0.0776 in.
Primer	M82

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods of not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing:	
(Propelling Charge)	1 charge with additive jacket in plastic barrier bag or metal container; 16 metal containers per pallet
Container	M460
Weight	96.0 lb
Dimensions	9-13/16 in. Dia. x 55 in.
Cube	3.1 cu ft
*Pallet:	
Weight	2020 lb
Dimensions	40 x 55 x 45-1/2 in.
Cube	57.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	2
Storage compatibility	J
DOT shipping class	B

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DOT designation	PROPELLANT EXPLOSIVES SOLID CLASS B
DODAC	1320-D361
Drawing No.	M86 - 8837005 M86A1 M86A2- 8837905
*Packing:	
(M5 Flash Reducer)	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box
Weight	66 lb
Dimensions	19-1/8 x 10-5/8 x 14-7/8 in.
Cube	1.74 cu ft

Shipping and Storage Data:

Quantity-distance class	7
Storage compatibility	O
DOT shipping class	A
DOT designation	BLACK POWDER
DODAC	1320-D493
Drawing number	9212660
*Packing:	
(M1 Additive Jacket)	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box
Weight	80 lb
Dimensions	23-3/8 x 15-3/16 x 15-9/32 in.
Cube	2.72 cu ft

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility	N/A
DOT shipping class	N/A
DOT designation	AMMUNITION NONEXPLOSIVE
DODAC	1320-D110
Drawing number	9207962

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Limitations:

Zone 3 firing of Charges M86 and M86A1 is restricted to combat use only. The restriction does not apply to M86A2. In addition, all M86 and M86A1 charges require a special inspection of the central ignition core prior to firing. M86A2 charges suspected of rough handling must also undergo this inspection.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10

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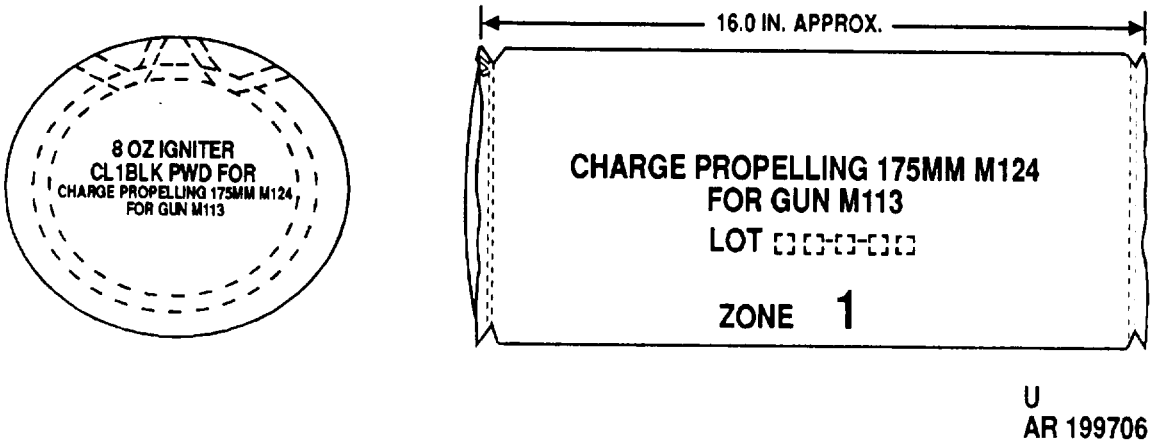
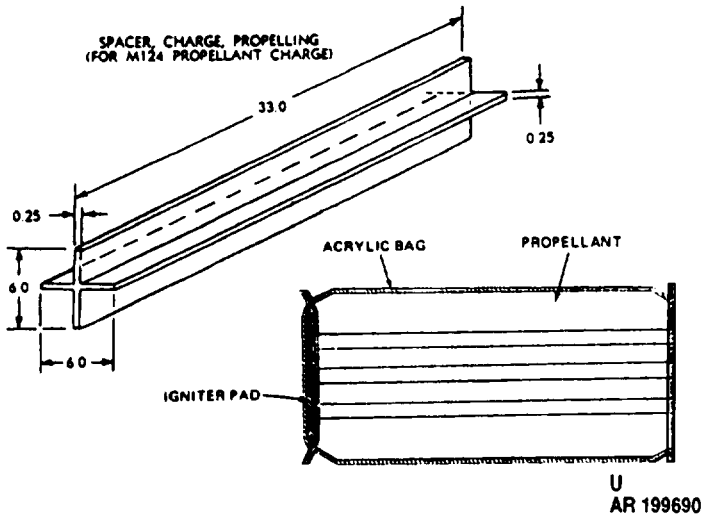
CHARGE, PROPELLING, 175-MILLIMETER: M124





Type Classification:

Standard AMCTC 7622 dtd 1970.

Use:

Propelling charge M124 is used with gun cannons Ml13 and Ml13A1 for firing in Zone 1 only.

Description:

Charge M124 is a single increment, green bag charge, approximately 16 inches long. The charge contains approximately 17 pounds of Propellant M6 in an acrylic viscose-rayon bag. An igniter pad containing 8 ounces of black powder is attached to the base of the charge, An igniter protector cap covers the igniter pad during shipment and storage. Percussion primer M82 is used to ignite the charge. The charge must be used with a non-integral, separately issued spacer. The spacer is a cruciform fabricated from polyurethane and approximately 33 inches long.

Functioning:

The flash of the black powder charge from percussion primer M82 ignites the igniter pad and the black powder core to ignite in turn the M6 propellant charge, The burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The cloth material is essentially consumed by the burning. (The

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spacer is inserted into the weapon chamber prior to the charge and serves to prevent fall-back of the projectile on top of the propelling charge.)

Tabulated Data:

Charge, Propelling M124:	
Type	Green bag
Weight	17.5 lb
Length	16 in.
Propellant:	
Composition	M6
Grain type	7 perforated; L/O= 2.35
Weight	17 lb
Web	0.37in.
Igniter	8 oz black powder base pad
Primer	M82
Cannon used with	M113, M113A1
Assembly Dwg No.	9223106
Color	Green w/black
*Packing	3 charges and 3 primers in metal container
*Packing Box:	
Weight	95 lb
Dimensions	55-3/8 x 10-15/32 x 10-15/32
Cube	3.5 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data;

Quantity-distance class	
Storage compatibility group	
DOT shipping class	
DOT designation	PROPELLANT EXPLOSIVE SOLID B-CLASS B
DODAC	1320-D536

Limitations:

The charge must be used with a spacer which is a separate item of issue.

CruciformSpacer:

NSN	1320-01-010-0145
Weight	1 lb (approx)
Length	33 in.
Drawing No.	9298769
Cannon used with	M113, M113A1
Dimensions	33 x 6 x 6 (1/4 in. thick flange)
Packing	48 spacers in wirebound box
Packing Box:	
Weight	111 lb
Dimensions	32-7/8 x 24-3/4 x 35-3/8 in.
Cube	16.2 cu ft

Shipping and Storage Data:

Quantity-distance class	Not applicable
Storage compatibility group	Not applicable
DOT shipping class	Not applicable
DOT shipping class	Not applicable
DODAC	Not applicable

References:

SB 700-20
TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10

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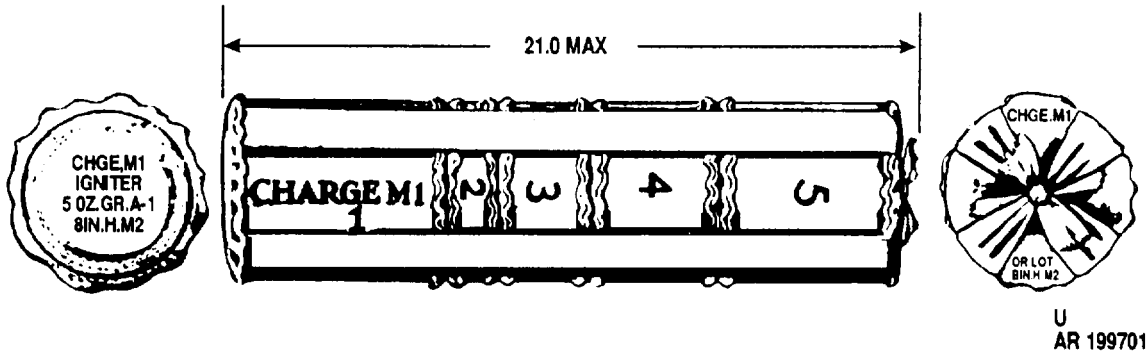
CHARGE, PROPELLING, 8-INCH: Ml



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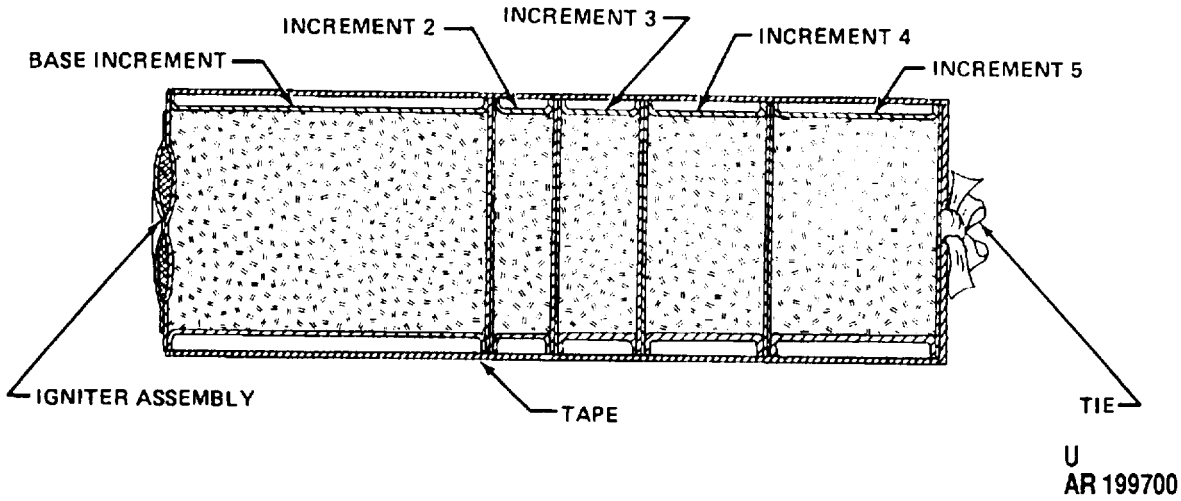

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Type Classification:

Std OTCM 36841 dtd 1958.

Use:

8-Inch Green Bag Propelling Charge Ml is used for zone firing with Charges 1 to 5 in 8-inch howitzer cannons.

Description:

The charge consists of a base section (Charge 1) and four unequal increments (2 through 5) of propellant Ml in green cloth bags, The increments are assembled end to end in sequence, and held in place by four tying straps sewn to the base of Increment 1 and tied over the top of Increment 5. A red igniter pad containing 5 ounces of black powder is sewn to the base of Increment 1. Each increment of the charge and the igniter pad is identified by black stencil markings.

Functioning:

The flash from the primer ignites the black powder igniter pad, which in turn ignlites the Ml propellant in" the charge, The burning propellant generates gases which force the pro: jectile out of the gun tube at a velocity required to reach the target.

Tabulated Data:

Type	Green Bag, separate loaded propelling charge
Weight	15.0 lb
Length	21.0 in. (max)
Diameter	6.50 in. (max)
Color	Green w/black marking
Propellant:	
Composition	M1
Grain type	1 perforated L/D = 4.6
Weight	13. 6 lb
Web	0.017 in.

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Primer---Model	Used with Cannon (Weapon)
MK2A4	M2, M2A1 (M115)
M82	M47, (M55); M2A2, (M110)
MK15 Mods 2 & 3	M47, (M55); M2A2, (M110)
MK34	M47 (M55)

Assembly Dwg. No. ---------- 8860491

Temperature Limits:

Firing:
- Lower limit ---------- -40°F
- Upper limit ---------- +125°F

Storage:
- Lower limit ---------- -80°F (for periods of not more than 3 days)
- Upper limit ---------- +160°F (for not more than 4 hr/day)
- *Packing ---------- 1 charge in metal container; 50 metal containers per pallet
- Container ---------- M18A2
- Weight ---------- 34 lb
- Dimensions ---------- 8-13/32 dia. x 26-9/32 in.
- Cube ---------- 1.1 cu ft

Pallet:
- Weight ---------- 1650 lb
- Dimensions ---------- 44 x 52 x 50 in.
- Cube ---------- 67.2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage:

- Quantity-distance class ---------- 2
- Storage compatibility group ----- J
- DOT shipping class ---------- B
- DOT designation ---------- PROPELLANT EXPLOSIVES SOLID CLASS B
- DODAC ---------- 1320-D675

Limitations:

N/A.

References:

AMC-P 700-3-3
SB 700-20
TM 9-2300-216-10
TM 9-1300-250
TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34

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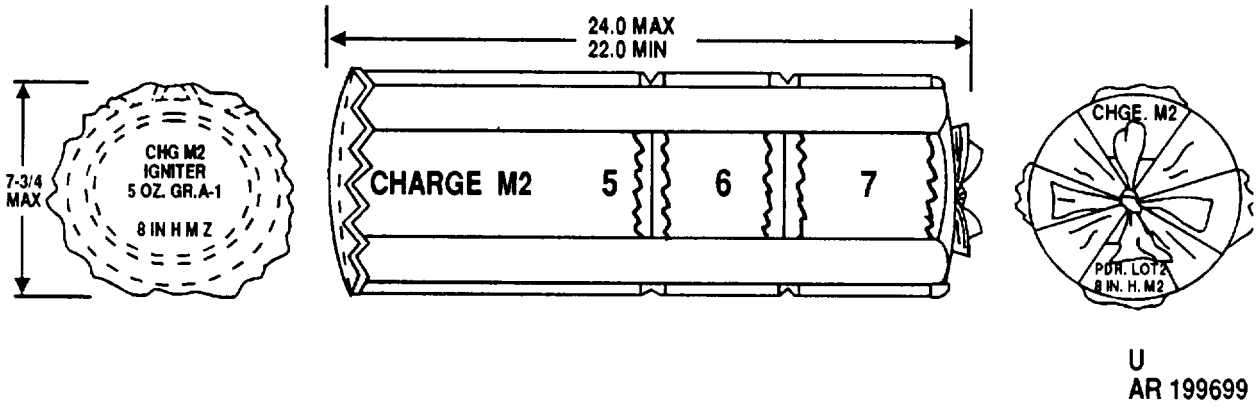
CHARGE, PROPELLING, 8-INCH: M2



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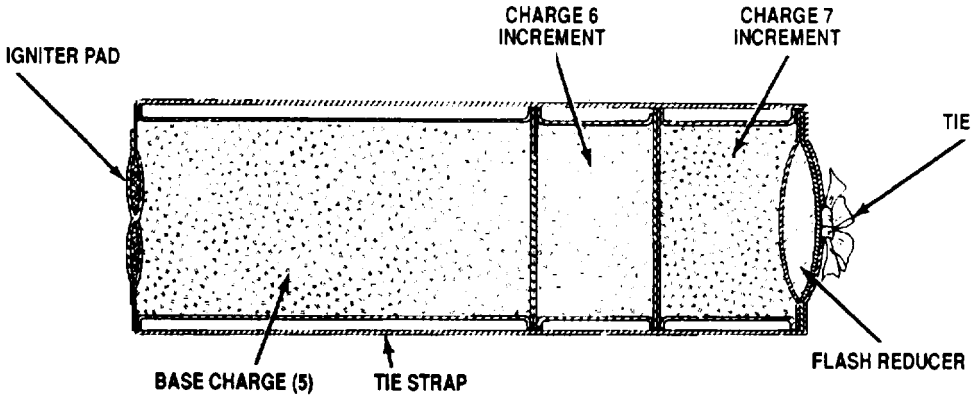

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AR 199698

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

8-Inch White Bag Propelling Charge M2 is used for zone firing with Charges 5 through 7 in 8-inch howitzer cannons.

Description:

The charge consists of a base section (Charge 5) and two unequal increments (Charges 6 and 7) for zone firing . The increments are assembled end to enf in sequence, and held in place by four tying straps sewn to the base of Increment 5 and tied over the top of Increment 7. A red cloth igniter pad containing 5 ounces of black powder is sewn to the base of Increment 5. Each increment of the charge and the igniter pad is identified by black stencil markings. In use an M3 Flash Reducer is inserted under the tie straps at the forward end of the charge. Flash Reducer M3 is a separate item of issue to be used when firing all zones of the M2 Propelling Charge. It consists of a square pad of red cloth containing a 1 pound mixture of potasium sulfate and black powder.

Functioning:

The flash from the primer ignites the black powder igniter pad, which in turn ignites the Ml propellant in the charge. The burning propellant generates gases which force the projectile out of the gun tube at a velocity required to reach the target. The flash reducer serves to reduce the amount of blast overpressure at the muzzle. Although the flash reclucer increases the quantity of smoke, it must be used in daylight firing as well as night firing unless it is tactically impossible.

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Tabulated Data:

Type	White Bag, separate loading propelling charge
Weight	30 lb
Length	24.0 in. (max)
Diameter	7-3/4 in. (max)
Color	White w/black markings
Propellant:	
Composition	M1
Grain Type	7 perforated cylinder
Weight	28.5 lb
Web	0.043 in.
Primer-----Model	Used with Cannon (Weapon)
MK2A4	M2, M2A1 (M115)
M82	M47 (M55); M2A2 (M110)
MK15 Mods 2 & 3	M47 (M55); M2A2 (M110)
MK34	M47, (M55)
Assembly Drawing No.	8861374

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	- 80°F (for periods of not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	1 charge in metal container; 32 metal containers per pallet
*Container	M19A2
Weight	54 lb
Dimensions	9-13/16 in. dia x 29-9/32 in.
Cube	1.6 cu ft
Pallet:	
Weight	1732 lb
Dimensions	44 x 58-1/2 x 47 in.
Cube	64 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Propellant:	
Quantity-distance class	2
Storage compatibility group	J
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID CLASS B
DODAC	1320-C676
Packing, M3 Flash Reducer	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box
Weight	80 lb
Dimensions	17-1/8 x 14-3/8 x 9-1/2 in.
Cube	1.35 cu ft
Black powder:	
Quantity-distance class	7
Storage compatibility group	0
DOT shipping class	A
DOT designation	BLACK POWDER
DODAC	1320-D676
Drawing number	8861374

Limitations:

The M2 propelling charge must be used with an M3 flash reducer. If flash reducers are not available, occasional blast overpressure and excessive flash may be experienced.

References:

SB 700-20
AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1300-206
TM 9-1300-250
TM 9-2300-216-10

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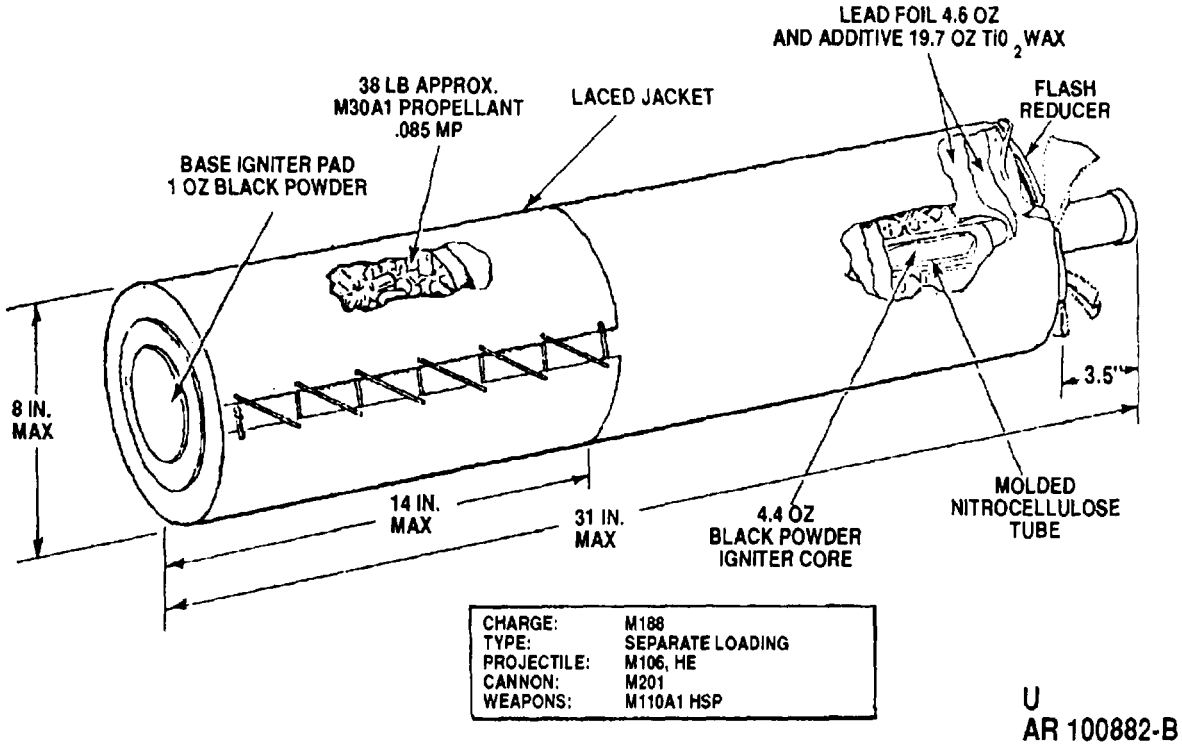
CHARGE, PROPELLING, 8-INCH: M188



Type Classification:

Std.

Use:

The M188 is a Zone 8 charge designed to supplement the standard M1 and M2 charges and provide extended range for 8-inch howitzer M110A1.

Description:

The M188 Propelling Charge is a single increment, white bag charge, approximately 31 inches long and 8 inches in diameter, The charge contains approximately 38 pounds of high-energy M30A1 propellant in a cloth bag, A red igniter pad containing 1 ounce of black powder is sewn to the base of the charge. A central ignition core extends through the center of the charge for almost its entire length, This ignition core consists of a nitrocellulose paper tube, containing a bag of black powder, which is sewn to the base igniter. A liner consisting of a cloth side, impregnated with titanium dioxide and paraffin wax, and a lead side lines the forward end of the charge, Four tie straps sewed to the base of the charge run the length of the charge and are tied at the forward end of the charge. A flash reducer is inserted under the tie straps at the forward end of the charge. A cylindrical jacket is placed over the charge length and tightly laced. This lacing jacket serves to provide necessary rigidity and structural stability of the assembled charge.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad] at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge, Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target. The flash reducer functions to reduce blast over-pressure and flash at the muzzle of the weapon,

Tabulated Data:

M188 Charge:

Type	Separate loaded Propelling charge, white bag
Weight	40 lb (18 kg)
Length	31.0 in. (79 cm)
Color	White w/black markings
Primer used	M82
Cannon used with	8-inch SP Howitzer M110A1

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Assembly Dwg. No,	9277173
Propellant:	
Grain type	7perforated cylinder, L/D=2.35
Composition	M30Al
Weight	38 lb (17 kg)
Web	0.085 in. (0.216 cm)
Igniter:	
Baaepad	1 oz (28 g) Black Powder
Central core	4.4 oz (124.7 g) black powder

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62°C) (for periods not more than 3 days)
Upper llmit	+160°F (71°C) (for periods not more than 4 hr/day)
*Packing	1 propelling chargein metal container
*Container:	
Weight	75 lb (34 kg)
Dimensions	291/4 in. x 10 15/32 in. (74.29 cm x 26.59 cm) dia
Cube	2.4 cu ft (0.07 cum)

NOTE: See DOD Consolidated Ammunition Catalog for complete packging data including NSN'S.

Shipping and Storage Data:

Quantity-distance class	2
Storage compatibility group	J
DOT shipping class	B
DOTdesignation	PROPELLANT EXPLOSIVES CLASSB SOLID
DODAC	1320-D661

Limitations:

The M188 propelling charge cannot be stored or shipped in the vertical position, due to damage that could be caused to the igniter core.

References:

SB **700-20**
AMC-P 700-3-3
TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10

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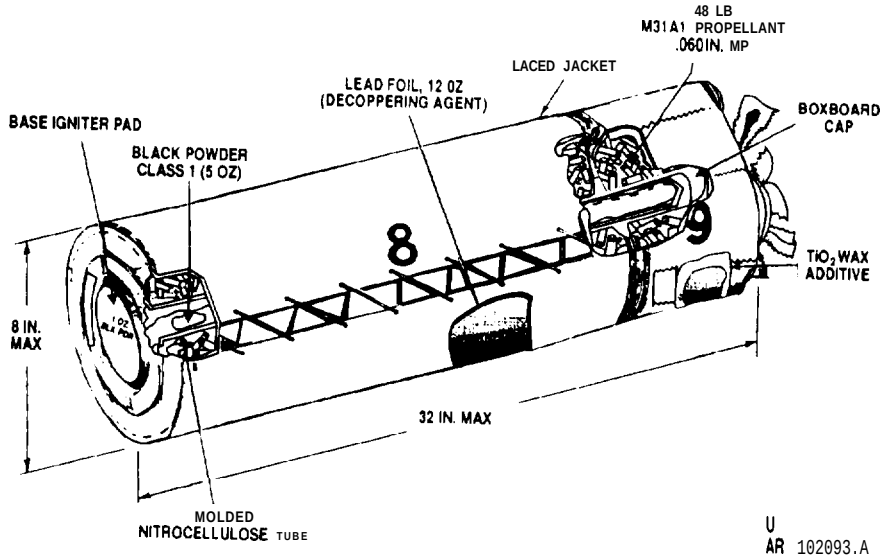
CHARGE, PROPELLING, 8-INCH: M188A1



Type Classification:

Std MSR **08756016.**

Use:

The 8-inch M188A1 separate-loading propelling charge provides extended range (zones 8 and 9) in the 8-inch: Ml 10A2 Self-Propelled Howitzer.

Description:

The M188A1 is a two increment (zones 8 and 9) white-bag charge, 32 inches long by 8 inches in diameter, The charge weighs 50 pounds and contains 48 pounds of high-energy propellant M31A1. A base igniter pad, containing 1 ounce of black powder, is attached to the base of the charge by a 360 degree seam, An igniter core extends through the center of the charge for almost its entire length. This center core consists of a molded nitrocellulose tube 1.4 inches in diameter, containing a 5 ounce bag of class 1 black powder which is sewn to the igniter pad at the base of the charge.

An additive to reduce gun tube wear lines the increment 9 charge bag. This liner consists of cloth which is impregnated with a composition of titanium dioxide and paraffin wax. The increment 8 charge bag is lined with lead foil for decoppering. A 26-inch long lacing jacket is positioned around the increment 8 charge bag to increase the structural stability of the charge. Four tie straps, sewed to the base of the increment 8 charge bag, run the length of the two increment charges and are tied with interlapping square knots at the forward end of increment 9. A paper igniter protector cap is placed over the igniter pad at the base of the charge when it is packed for shipment. This igniter protector cap must be removed before firing.

During storage the cloth bag develops a yellow discoloration, This condition is not classified as a defect and all such charges are considered safe to fire.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge, The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge, Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target.

Tabulated Data:

propelling Charge:

Type	Separate loaded Propelling charge, white bag
Model	M188A1
Weight	50 lb (22,7 kg)
Length	32.0 in. (81.3 cm)
Color	White w/black markings

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Propellant:	
Composition	M31A1 (48.0 lb) (21.7 kg)
Green type Multi-perf web	0.060 in. (0.153 cm)
Weight:	
Increment 8	42 lb (19.05 kg)
Increment 9	6 lb (2.27 kg)
Igniter:	
Base Pad	1 oz BP (28 g)
Center Core	5 oz BP (141.7 g)
Weight of Liner	4 oz (113.4 g)
Primer	M82
Cannon used w/	M201A1
Muzzle Velocity	(Zone 8) 2330 fps (710 mps)
Muzzle Velocity	(Zone 9) 2530 fps (771 mps)
Chamber pressure	(Zone 8) 32,000 psi (22,499,200 kg/m^2)
Chamber pressure	(Zone 9) 39,600 psi (27,842,760 kg/m^2)

Temperature Limits:

Firing:	
Lower limit	-50°F (-45.5°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-80°F (-62.2°C) (3 days or less)
Upper limit	+160°F (+71.1°C) (4 hr or less per day)
Packing	1 charge per metal container; 20 containers per pallet
Container: PA66	
Weight	76 lb (34.7 kg)
Dimensions	37-3/4 in. x 10-15/32 in., dia (95.9 cm x 26.6 cm)
Cube	2.4 cu ft (0.068 cu m)
Pallet:	
Weight	1730 lb (784.7 kg)
Dimensions	49 x 53-1/2 x 40-3/4 in. (1.24 x 1.36 x 1.04 m)
Cube	61.8 cu ft (1.75 cu m)

Shipping and Storage Data:

Storage class/SCG	1.3 C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVES CLASS B SOLID
DODAC	1320-D662
Drawing No. (M188A1)	11829092

Limitations:

The M188A1 propelling charge cannot be stored or shipped in the vertical position.

NOTE

Yellow discoloration of charge bags is not a defect as all M188A1 charges containing stabilizer 2NDPA will discolor. The amount of stabilizer leeching to discolor the cloth is not an indication of stabilizer unservicebility, as the amount needed to discolor the cloth is insignificant with respect to loss of stabilizer content.

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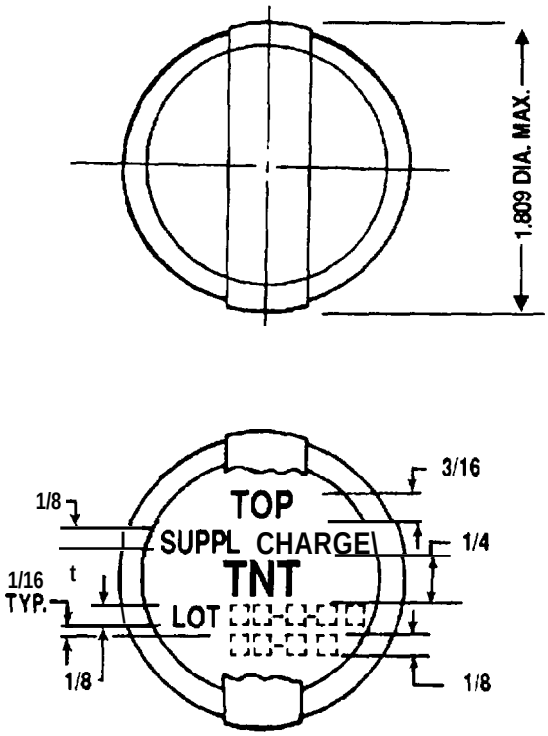
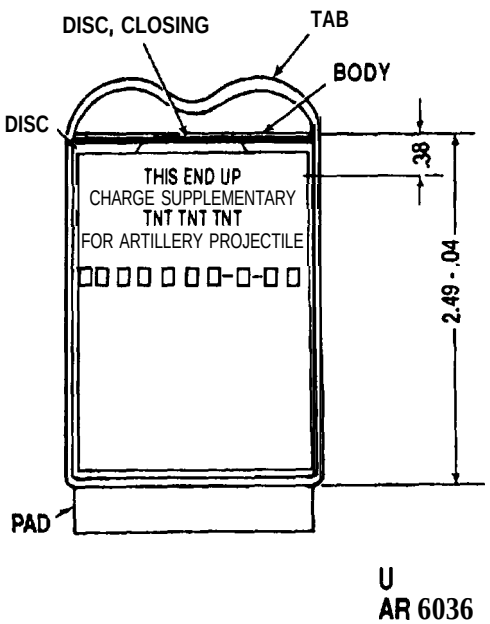
SUPPLEMENTARY CHARGES





Type Classification:

Std.

Use:

The purpose of a supplementary charge is to aid in the detonation of the explosive filler upon activation of the fuze.

Description:

Supplementary charges are placed in the fuze well of all HE deep cavity howitzer rounds from 75mm to 8-Inch; in the 175mm Field Gun and in the 4.2 inch mortar projectiles They are removed from the deep cavity when proximity fuzes with the extra large (long) booster or expelling charge, i.e., the M513, M514 Series and M728 but not the M732 or other proximity fuzes with the normal size booster. Supplementary charges are composed of approximately .30 lb of TNT pellets packed into an aluminum body cup. Supplementary charges are factory loaded into the HE rounds.

Function:

When the fuze mechanism detonates the booster charge this activates the supplementary charges which aids in the detonations of the explosive charge of the round.

Tabulated Data:

Weight	0,30 lb approx
Length	2.49-0,04 in.
Width	1.809 in.
Filler	TNT, 0.30 lb approx
Body	Aluminum cup

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Temperature Limits:

Firing:
- Lower limits ---------- -40°F (-40°C)
- Upper limits ---------- +125°F (+52°C)

Storage:
- Lower limit ---------- -65°F(-53.8°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°C) (for . period not more than 4 hr/day)

Packing:

144/Barrier bag
1 Barrier bag/wood box
Drawing No. ---------- 8797090
National Stock No. ---------- NSN 1370-00-824-0811

References:

TM 9-1300-251-20
TM 9-1300-251-34
TM 9-1300-206
TM 9-2350-304-10

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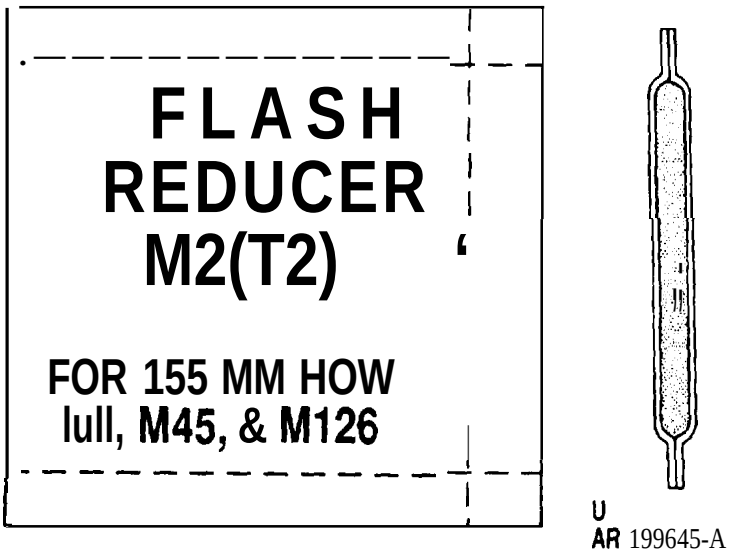
FLASH REDUCER M2 (T2)



U
AR 199645-A

Type Classification:

STD OTCM 31154 dtd 1946,

Use:

Flash Reducer M2 (T2) is used with White Bag Propelling Charges M4 and M4A1 in 155mm howitzer cannons, ordinarily on an optional basis. However, TB 9-1300-385 requires use of this flash reducer with certain specific lots of Propelling Charge M4. The primary purpose is the reduction of muzzle flash to make accurate weapon location more difficult for the enemy. A secondary effect is reduction of blast pressure at the muzzle, When used, one flash reducer is inserted at the forward end of each increment used, including the base charge, Even though Propelling Charge M4A2 has an integral flash reducer assembled at increment No. 3, the M2 (T2) maybe used as a supplement with that charge also, if additional flash reduction is desired. No flash reducers are required when using Green Bag Propelling Charge M3.

Description:

Flash Reducer M2 (T2) consists of 1-1/2 ounces of black powder and potassium sulphate or potassium nitrate mixture in a 4-inch square bag of red cotton cloth. The edges are sewn together to prevent leakage of the chemical mixture.

Functioning:

The flash reducer is ignited by the burning propellant. When the black powder and potassium nitrate or potassium sulphate mixture burns in combination with the propelling charge, the chemical reaction causesareduction in muzzle flash of the weapon. The likelihood of blast overpressure from the muzzle is also reduced, There is some increase in smoke at the weapon muzzle when the M2 (’1’2) is used.

Tabulated Data:

Weight	0.06 lb
Dimensions	4 x 4 in.
Cannon (Weapons) used with	Ml, M1A1 (M114, M114A1): M45 (M44, M44A1): M126, M126A1 (M109); M185 (M109A1); M199 (M198)
Propelling charges used with	M4, M4A1, M4A2

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Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods not more than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)
*Packing	200 flash reducers in metal container 4 container in wooden box
*Packing Box:	
Weight	68.21b
Dimensions	26-7/16 x 13 x 11-15/16 in.
Cube	2.37 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	7
Storage compatibility group	0
DOT shipping class	A
DOT designation	BLACK POWDER
DODAC	1320-D552
Assembly Dwg. No.	9229177

Prepmation for Firing:

None

References:

TM 9-1300-251-20
SB 700-20
AMC-P 700-3-3

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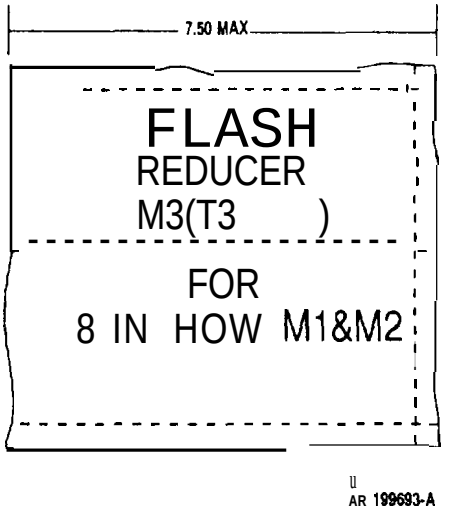
REDUCER, FLASH: M3 (T3)



Type Classification:

Std **AMCTC 8020** dtd 1970,

Use:

Flash Reducer M3 is used when firing 8-inch White Bag Propelling Charge M2 (all zones), It is not used with Green Bag Propelling Charges Ml which are flashless. The primary purpose is the reduction in muzzle flash to make accurate weapon location more difficult for the enemy. It is used in both night and daylight firings. A secondary effect is reduction of blast pressure at the muzzle,

Description:

The flash reducer is a square red cloth pad containing a one-pound mixture of black powder and potassium sulphate or potassium nitrate. The assembly is sewn around each edge to prevent leakage of the contents, and through the center to increase tear resistance. Thus, the appearance is of two equal increments. The flash reducer is inserted under the tie/straps at the forward end of the propelling charge at time of firing.

Functioning:

The flash reducer is ignited by the burning propellant, The chemical combination of burning potassium and propellant serves to modify the flashing of gases at the muzzle of the weapon. The result is a reduction in brilliance and of the blast overpressure at the muzzle.

Tabulated Data:

Type	Chemical modifier
Weight	1 lb
Dimensions	7-1/2 x 7-1/2 in.
Color	Red w/black markings
Filler	Potassium sulphate or potassium nitrate Black powder
Cannon (Weapon) used with	M47 (M55), M2, M2A1 (M115), M2A1E1 (M115)
Charges used with	8-inch Charge Propelling: M2
Assembly Dwg. No.	8881015

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+ 125°F

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Storage:	
Lower limit	-80°F (for periods not longer than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)
*Packing	10 flash reducers in carton; 1 carton in barrier bag; 4 bags in wooden box
*Packing Box:	
Weight	80 lb
Dimensions	17-1/8 x 14-3/8 x 9-1/2 in.
Cube	1.35 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	7
Storage compatibility group	0
DOT shipping class	A
DOT designation	BLACK POWDER
DODAC	1320-D681

Limitations:

None.

References:

TM 9-1300-251-20
TM 9-2300-216-10

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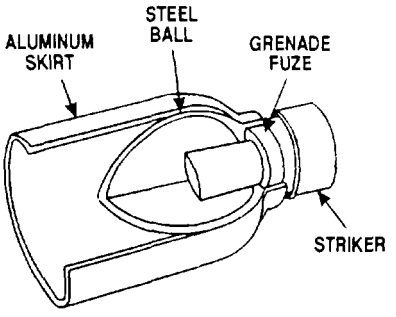
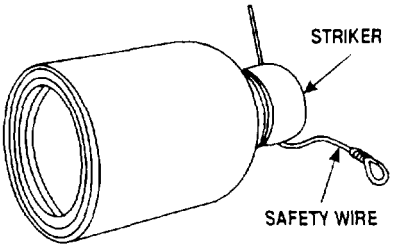
GRENADE: GENERAL PURPOSE, M35



CUTAWAY VIEW WITH RIBBONS REMOVED (ARMED) STRIKER PLATE EXTENDED



GRENADE WITH RIBBONS FURLED AND SAFETY WIRE IN PLACE (UNARMED)

U
AR 101392

Type Classification:

Use:

To provide improved antipersonnel capability when loaded in 105mm cartridge, M413.

Description:

The grenade M35 is a ground burst munition consisting essentially of a steel ball with an aluminum skirt and a point-detonating grenade fuze and striker in the nose. Two nylon ribbon streamers, attached to the inside of the aluminum skirt, orients and drag-stabilizes the grenade in flight. The steel ball is filled with 28 grams of Composition B.

Three grenades in the layer next to the base plug of the M413 projectile contain a yellow dye which acts as a spotting charge. The dye is in polyethylene bags secured by a polyethylene cup which is located beneath the ribbon streamers.

The fragmenting portion of the grenade body consists of a steel sphere filled with Composition B, a booster retainer, felt pad and booster pellet. The inner surfaces of the sphere have been embossed in such a manner that upon detonation, it bursts uniformly into fragments of optimum effectiveness.

Classification:

Standard B.

Tabulated Data:

Explosive	28 grams Comp B
Length	2.46 in.
Diameter	1.48 in.

Functioning:

When each grenade M35 is expelled from the projectile body, the grenade fuze pulls free of the safety. wire which is attac'heel to the spacer plate.

This starts a mechanical action within the grenade fuze which alines the explosive train.

The aluminum skirt of the grenade contains two streamer ribbons which unf'url when the grenade is in free flight. These ribbons drag-stabilize and orient the grenade with the point detonating grenade fuze and striker downward.

When the striker impacts, the grenades detonate. The yellow dye, which was contained in three grenades, is visible for two miles on a clear day

Drawing:

Grenade - XP94930

Reference:

TM 9-1300-251-20

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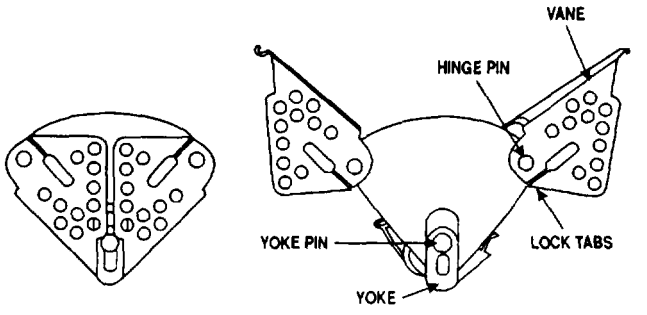
GRENADE: GENERAL PURPOSE, M36



Type Classification:

Use:

To provide improved antipersonnel capability when loaded into 105mm cartridge M444E1 and 107mm cartridge M453.

Description:

The grenade M36 is an airburst munition which is expelled from the projectile body in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly two spring-loaded vanes, a yoke with firing pin, ejection charge, delay detonator, and a two-piece steel ball filled with Composition A5.

Classification:

Standard A.

Tabulated Data:

Type of Explosive ---------- Comp A5
Explosive in one grenade -------- 21.25 grams
Total Weight ---------- 0.44 lb

Functioning:

Upon expulsion from the projectile, the vanes open and orient the grenade in a vertical or near-vertical position. The energy of the vane springs and the airstream lock the two vanes in the open position and stabilizes the grenade.

After the vanes are extended, a spring moves the yoke to the extended position, The firing pin, attached to the yoke, retracts from the slide assembly, permittmg movement of this assembly which locates the detonator in the armed position. A delay in arming of the grenade is provided by restricting movement of the slide assembly. This delay helps prevent premature grenade functioning caused by midair collision immediately after ejection from the projectile.

When the grenade impacts the target surface, the yoke drives the firing pin into the detonator which initiates the ejection charge. The ejection charge forces the steel ball up and away from the housing, ignites the first-fire mixture in the delay detonator, and forces the detonator into the in-line position. The delay detonator functions the high-explosive at a distance of 4 to 6 feet above the impacted surface, causing the steel ball to fragment.

Drawing;

Grenade M36--C921 1946

Reference:

TM 43-0002-33

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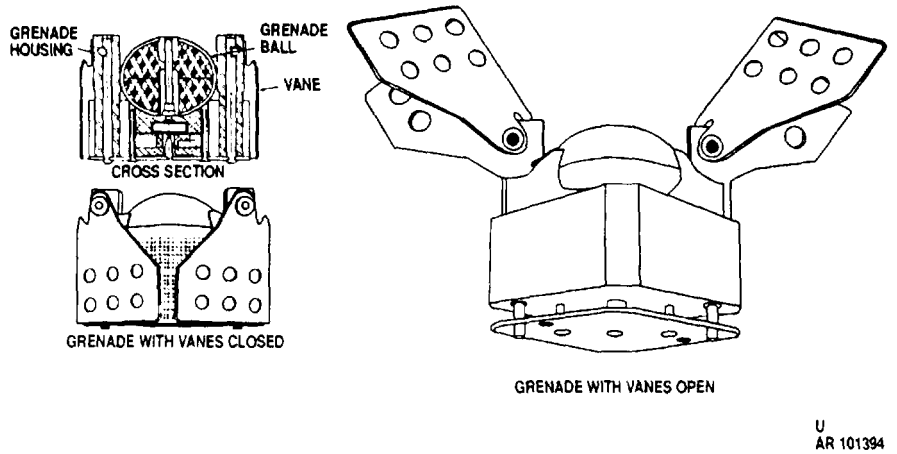
GRENADE: GENERAL PURPOSE, M39



Type Classification:

Use:

To provide improved antipersonnel capability when loaded in 105mm cartridge M444.

Description:

The grenade M39 is an airburst munition which is expelled from the projectile body in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly two vanes which extend in flight, pivoted on two D-shaped sear pins, a striker plate with firing pin, two striker plate guide rods which interlock the sear pins, ejection charge, delay detonator, and a two-piece steel ball filled with Composition A5. There are 18 grenades in the M444 cartridge.

Classification:

Standard A.

Tabulated Data:

Explosive ---------- 23.55 g
Comp A5

Functioning

When each grenade M39 is expelled from the projectile body, the vanes open and orient the grenade by interaction of the air stream.

The D-shaped sear pins rotate with the vanes, and free the striker plate guide rods which allow the spring to extend the striker plate.

This action withdraws the firing pin from the rotor and a spring forces the rotor into a position where the primer is aligned with the ejection charge and the delay detonator. The grenade is now armed.

The vanes are held open by the air stream and striker plate guide rods.

When the grenade impacts, the firing pin is driven into the primer which initiates the ejection charge.

The ejection charge initiates the delay detonator and propels the steel ball upward.

The delay detonator is assembled with a delay element designed to detonate the steel ball approximately 4 to 6 feet above impact surface.

Drawing:

F8864945

Reference:

TM 9-1300-251-20

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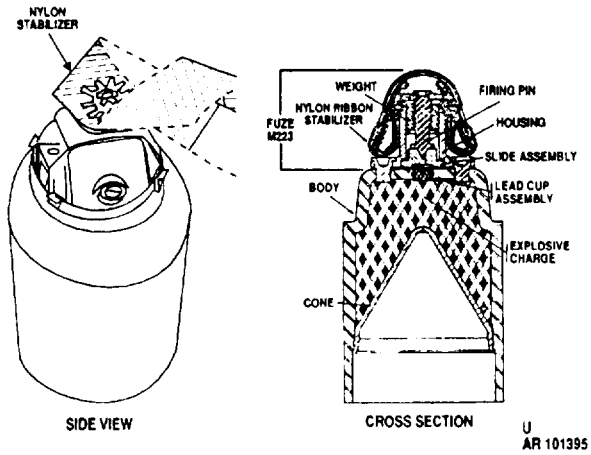
GRENADE: GENERAL PURPOSE, M42



Type Classification:

Use:

To provide anti-materiel and anti-personnel capabilities in a submissive delivered by 155mm M483 and 8-inch M509 projectiles for howitzers.

Description:

The M42 grenade is a ground burst munition consisting essentially of a 1.5 inch diameter cylindrical shell body loaded with approximately 31 grams of Composition A5 in a shaped charge. A nylon ribbon loop stabilizer is provided to orient and arm the grenade.

The inertia type fuze has a slide assembly containing an M55 detonator and a coil spring to force the slide into the armed position.

The M42 grenade has embossed inner side wall for optimum fragment size.

Classification:

Standard A.

Tabulated Data:

Explosive	30.5 grams Comp A5
Length	3.25 in.
Weight	0.46 lb

Functioning:

Upon expulsion from the projectile, the nylon ribbon stabilizer extends and orients the grenade, and due to rotational forces, unthreads the threaded firing pin from the weight (semi-armed), and pulls the firing pin out of the slide assembly, The slide assembly is then free to move, and moves into the armed position by action of the slide spring and centrifugal force. The spring maintains the slide assembly in the fully armed position.

Upon impact, the inertia weight drives the firing pin into the detonator M55, initiating the firing train. A shaped-charge jet is expelled downward while the body bursts into a large number of small fragments. The jet is capable of penetrating approximately 2.75 inches of homogeneous armor plate. Antipersonnel effects are obtained by fragmentation of the grenade body.

Drawing:

Grenade 9215340

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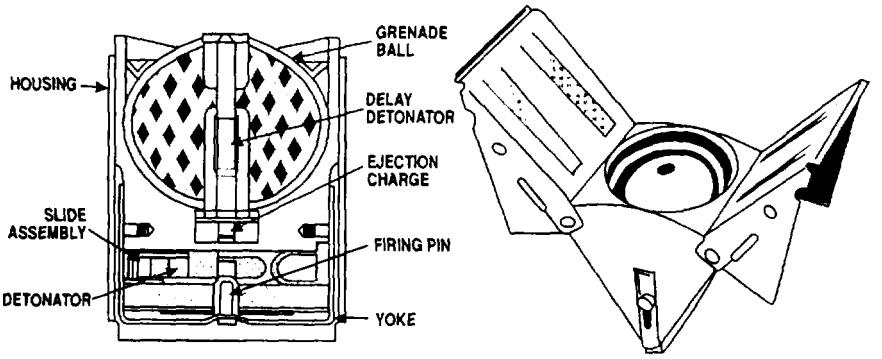
GRENADE: GENERAL PURPOSE, M43A1



CROSS SECTION

GRENADE WITH VANES OPEN

U
AR 101397

Type Classification:

Use:

To provide improved antipersonnel capability when loaded in 155mm projectile, M449 Series, 8-inch projectile M404 and 16-inch projectile mark 19 Mod O.

Description:

The grenade M43A1 is not painted or marked. It is an airburst munition which is expelled from the projectile in flight, Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly with two spring-loaded vanes and a two-piece steel ball filled with Composition A5.

Classification:

Standard A.

Tabulated Data:

Explosive 21.25 g Comp A5.

Functioning:

Upon expulsion from the projectile, the vanes open and orient the grenade In a vertical or near-vertical position, The energy of the vane springs and the airstream lock the two vanes in the open position and stabilize the grenade.

After the vanes are extended, yoke springs move the yoke to the extended position. The firing pin, attached to the yoke, retracts from the slide assembly, permitting movement of this assembly which locates the detonator in the armed position, A delay in arming of the grenade is provided by restricting movement of the slide assembly, This delay helps prevent premature grenade functioning caused by midair collision immediately after ejection from the projectile. Arming delay is achieved by allowing air to pass through a porous plug in the housing located adjacent to the slider recess.

When the grenade impacts the target surface, the yoke drives the tiring pin into the detonator which initiates the ejection charge. The ejection charge forces the steel ball up and away from the housing, ignites the first-fire mixture in the delay detonator, and forces the detonator into the in-line positon. The delay detonator functions the high-explosive Comp A5 at a distance of 4 to 6 feet above the impacted surface, causing the steel ball to fragment,

Drawing

8875900

Carriers:

M449 Series ((iO glenacles)
M404 <104 grenades)

References:

TM 9-1300-251-20

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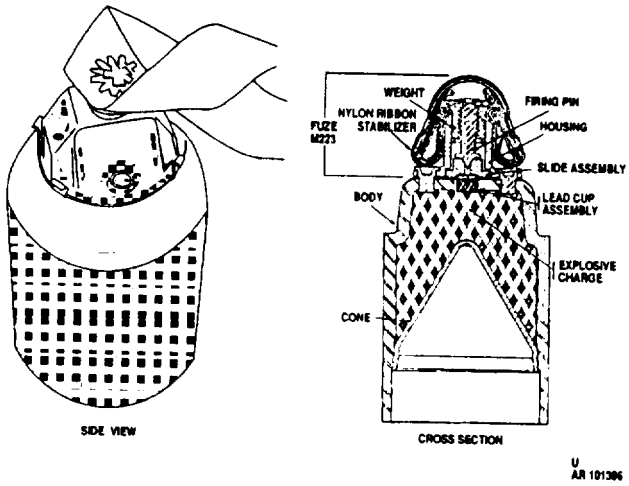
GRENADE: GENERAL PURPOSE, M46



Type Classification:

Use:

To provide antimateriel and antipersonnel] capabilities in submissiles carried in the last three aft layers in the 155MM M483 projectile for howitzers.

Description:

The M46 grenade is a ground burst munition consisting essentially of a 1,5 inch diameter cylindrical shell body loaded with approxi. mately 30 grams of Comp A5 in a shaped charge. A nylon ribbon loop stabilizer is provided to orient and arm the grenade, The inertia type fuze has a slide assembly containing a M55 detonator and a coil spring to force the slide into the armed position. The M46 grenade has a smooth inner side wall that makes the body wall stronger than the embossed wall of the M42 grenade. The wall does not have optimum fragmentation characteristics of the M42 grenade wall, but has extra strength to prevent compression failure during setback.

Classification:

Standard A,

Tabulated Data:

Explosive ---------- 30g Comp A5
Length ---------- 3,25 In
Weight ---------- 0.47 lb

Functioning:

Upon expulsion from the projectile, the nylon ribbon stabilizer extends and orients the grenade, and due to rotational forces, unthreads the threaded tiring pin from the weight (semi-armed), and pulls the tiring pin out of the slide assembly. The slide assembly is then free to move, and moves into the armed position by action of the slide spring and centrifugal force. The spring maintains the slide assembly in the fully armed position.

Upon impact, the inertia weight drives the firing pin into the M55 detonator, initiating the firing train. A shaped-charge jet is expelled downward while the body bursts into a large number of small fragments, The jet is capable of penetrating approximately 2,75 inches of homogeneous armor plate. Antipersonnel effects are obtained by fragmentation of the grenade body,

Drawing:

Grenade 9215370

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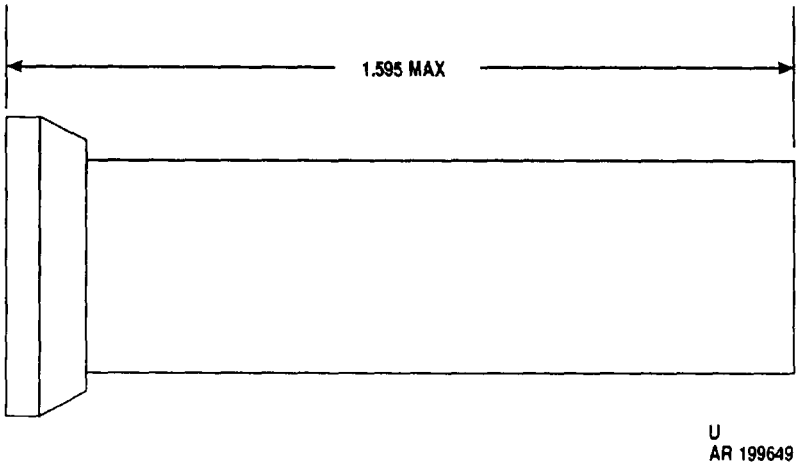
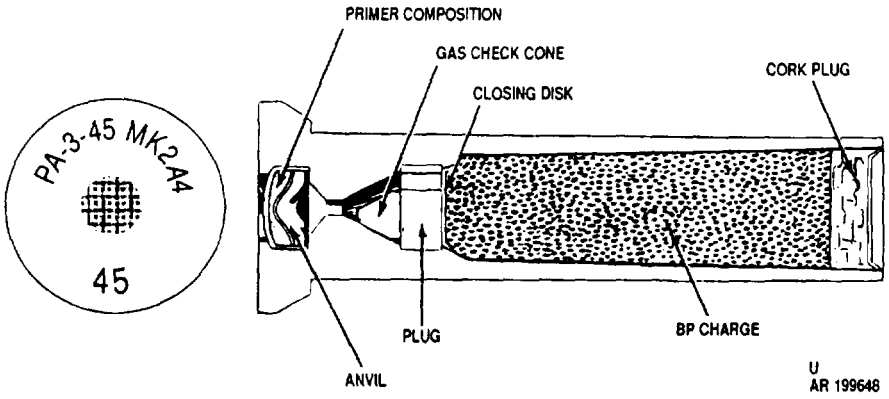
PRIMER, PERCUSSION: MK2A4





Type Classification:

Std OTCM 36841 dtd 1958.

Use:

This primer is used with a variety of separate-loading ammunition rounds to initiate burning of the propelling charge,

Description:

Percussion Primer MK2A4 is a brass cylinder with an extraction flange base, containing a charge of 19 grains of black powder, A primer cup in the center of the base contains a small quantity of sensitive primer composition, An anvil, gas check cone, and plug are installed between the primer cup and the black powder charge. The black powder is sealed in the primer case by a closing disk at the rear and a cork washer at the front end.

Functioning

The primer is inserted in the firing lock of the weapon. When struck by the firing pin, the primer cup is indented, compressing the sensitive primer composition against the anvil. The primer composition detonates from the impact shock and flashes through a port in the plug to ignite the black powder charge in the primer case, The gas check cone prevents blowback in the event the primer cup is ruptured, The burning black powder charge initates burning of the propelling charge.

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Tabulated Data:

Type	Percussion
Weight	0.06 lb
Length	1.595 in.
Diameter	0.348 in.
Cannon (Weapon) used with	155mm: M1, M1A1 (M114, M114A1) 8-in: M2, M2A1 (M115)
Filler and weight	Black powder, 19 grains

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods of not more than 3 days)
Upper limit	+160°F (for periods of not more than 4 hr/day)
*Packing	250 primers in shipping container; 2 containers in wirebound box
*Packing Box:	
Weight	37 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	3
Storage compatibility group	B
DOT shipping class	C
DOT designation	CANNON PRIMERS HANDLE CAREFULLY
DODAC	1390-N525
Assembly Dwg. No.	8840362

Preparation for Firing:

No preparation is required.

Limitations:

None.

References:

TM 9-1300-251-20
SB 700-20
AMC-P 700-3-3
TM 9-1025-200-12&P

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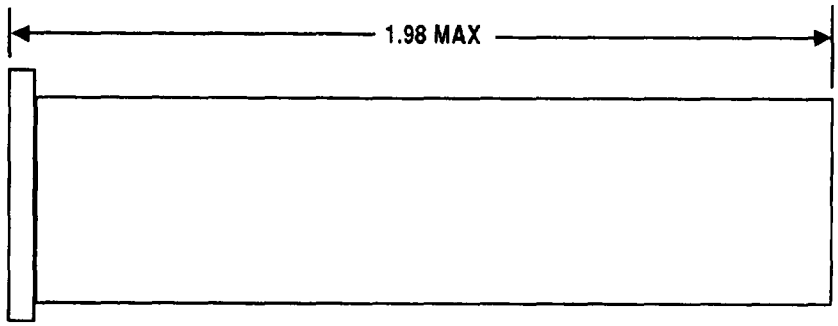
PRIMER, ELECTRIC AND PERCUSSION: MK15, MODS 2 AND 3



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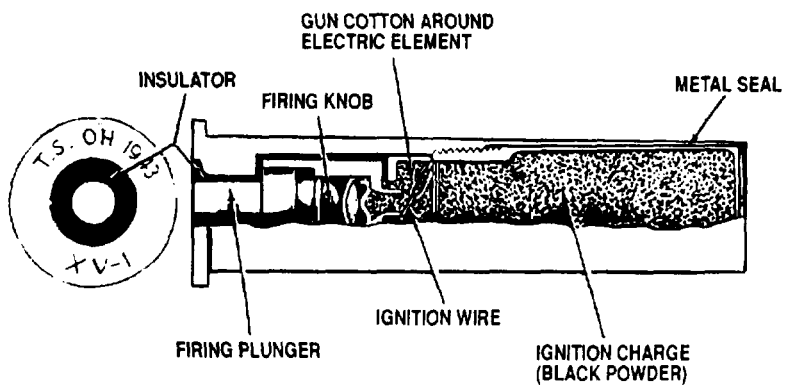
AR 199647



U
AR 199646

'Type Classification:

Std OTCM 37119 dtd 1959

Use:

This primer is used with a variety of separate-loading ammunition rounds to initiate burning of the propelling charge. The primer can be activated either by percussion from a firing pin, or by an electric current.

Description:

Primer MK15, Mods 2 and 3, is a brass cylinder with an extraction flange base. A charge container loaded with 30 grains of black powder is threaded into the case. The base contains a firing plunger assembly, a primer cap of sensitive primer compound, and an electrical resistance wire embedded in gun cotton, The plunger assembly is insulated electrically from the case, except for the resistance wire connecting the two parts.

Functioning:

The primer is inserted into the firing lock of the weapon. In the percussion mode, the firing plunger is struck by the firing pin, and the integral tiring knob crushes the primer cap. Flash of the primer compound flashes to the gun cotton and the black powder to initiate burning in the propelling charge. In the electrical mode a current induced by the electrical firing mechanism of the weapon is introduced into the firing plunger. Since the plunger is otherwise insulated from the case, the current flows through the resistance wire to the case. The resistance wire heats up to ignite the gun cotton and black powder.

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Difference Between Models:

Not applicable. Both Modifications 2 and 3 are incorporated in the same primer.

Tabulated Data:

Type	Electric and percussion
Weight	0.14 lb
Length	1.98 in.
Cannon used with	Various separate loading
Filler and weight	Black powder, 30 grains

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	38 per metal can; 24 cans (248) per metal box
*Packing Box:	
Weight	84 lb
Dimensions	25-1/4 x 16-1/2 x 6-1/4 in.
Cube	1.51 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	3
Storage compatibility group	B
DOT shipping class	C
DOT designation	CANNON PRIMERS HANDLE CAREFULLY
DODAC	1390-N535
AssemblyDwg No.	74-8-5

Preparation for Firing:

No preparation is required.

Limitations:

None.

References:

TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10
TM 9-2350-311-10

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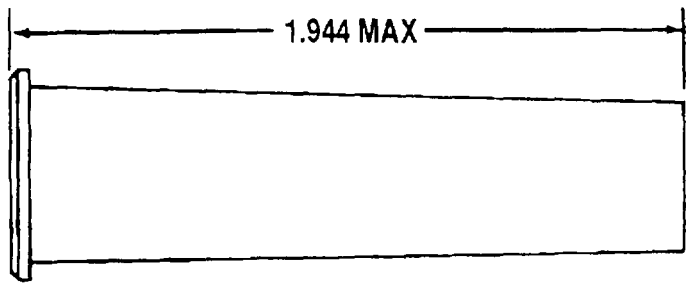
PRIMER, PERCUSSION: M82



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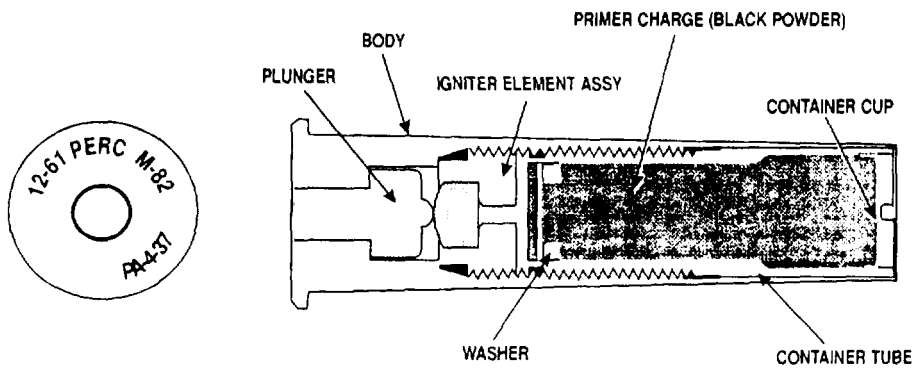
AR 199651



U
AR 199650

Type Classification:

Std OTCM 37807 dtd 1961.

Use:

This primer is used to initiate burning of propellant charges in separate loading weapon systems,

Description:

The primer consists of a cylindrical brass case with an extraction flange which contains a plunger in the base, an ignition element, and a container loaded with 22 grains of black powder. The plunger has an integral striker and is activated by the breech mechanism firing pin, The ignition element is threaded into the primer case forward of the striker and contains a percussion primer, The primer contains primer mixture and an anvil, and is sensitive to impact f'rom the plunger. The Black powder container is also threaded into the case with the open end toward the ignition element, This end is sealed with a paper disk to prevent seepage of" black powder granules,

Functioning:

The primer is inserted into the firing lock of the weapon, When struck in the base by the firing pin, the plunger is driven forward and initiates the primer in the ignition element, The primer flash ignites the black powder charge in the container assembly which flashes through the vent tube to ignite the black powder igniter at the base of the propelling charge.

Tabulated Data:

Type ---------- Percussion
Weight ---------- 0,14 lb
Length ---------- 1.94 in. max

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Cannon used with	155mm: M109A1, M1091 75-mm: M107 8-inch: M110, M110E2, M55
Filler and weight	Black powder, 22 grains
Percussion primer filler and weight	Primer mixture, 0.55 grains

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods of not more than 3 days)
Upper limit	+169°F (for not more than 4 hr/day)
*Packing	20 primers in fiberboard container; 25 containers in wooden box

*Packing Box:	
Weight	49 lb
Dimensions	24-1/8 x 12 x 11-3/16 in.
Cube	1.8 cu ft

*NOTE: Latest packing data only. See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	3
Storage compatibility group	B
DOT shipping class	C
DOT designation	CANNON PRIMERS HANDLE CAREFULLY
DODAC	1390-N523
Assembly Dwg. No.	8861197

Preparation for Firing:

No preparation is required.

References:

TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10
TM 9-2350-311-10

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PLUGS, LIFTING (EYEBOLT TYPE) FOR PROJECTILES

General:

Lifting plugs **are** inserted in the nose of all projectiles 155mm through 8-inch. Their significance is to make the shipping and handling of these heavy projectiles easier for personnel . A sawed off broom handle or bar is inserted through the ring (eye) to enable two men to lift and carry these projectiles.

The plug is removed before the projectile is fired and a fuze is inserted in the fuze well. To remove the lifting plug use any available bar by unscrewing counterclockwise.

Lifting plugs are in different sizes depending on the diameter of the fuze well and the type of the projectile.

ICM projectiles must be assembled with a fusible type lifting plug which is designed to prevent cargo ejection if the projectile is involved in a fire.

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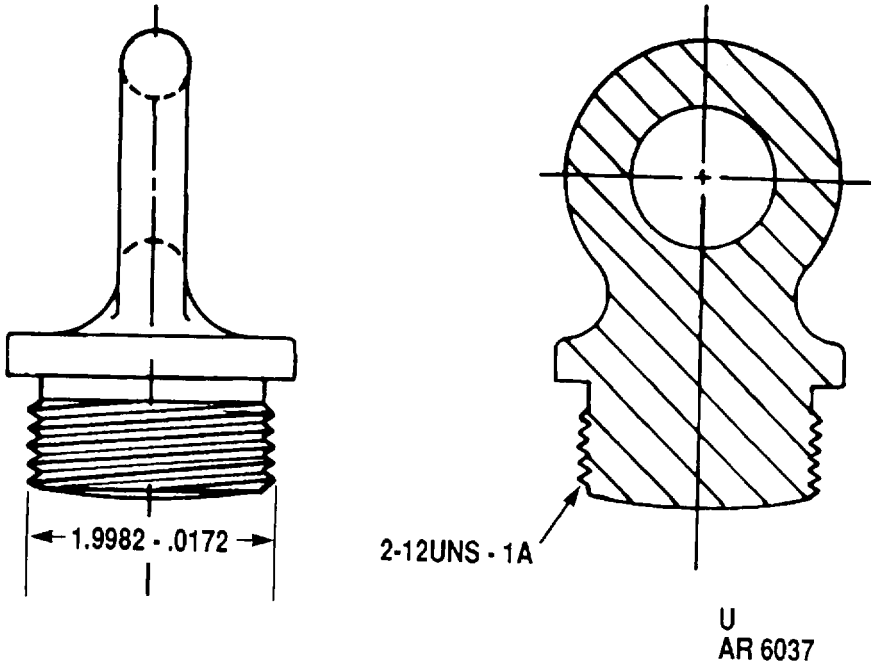
PLUG, LIFTING - TYPE G



Description:

Lifting plug type G is used for 8-inch, 175mm, and 155mm projectiles that have a fuze well thread size of 2-12 UNS-1A, major diameter 1.9982.

Material---------- Forged Steel
Drawing number 10520074
NSN 1320-00-844 6981

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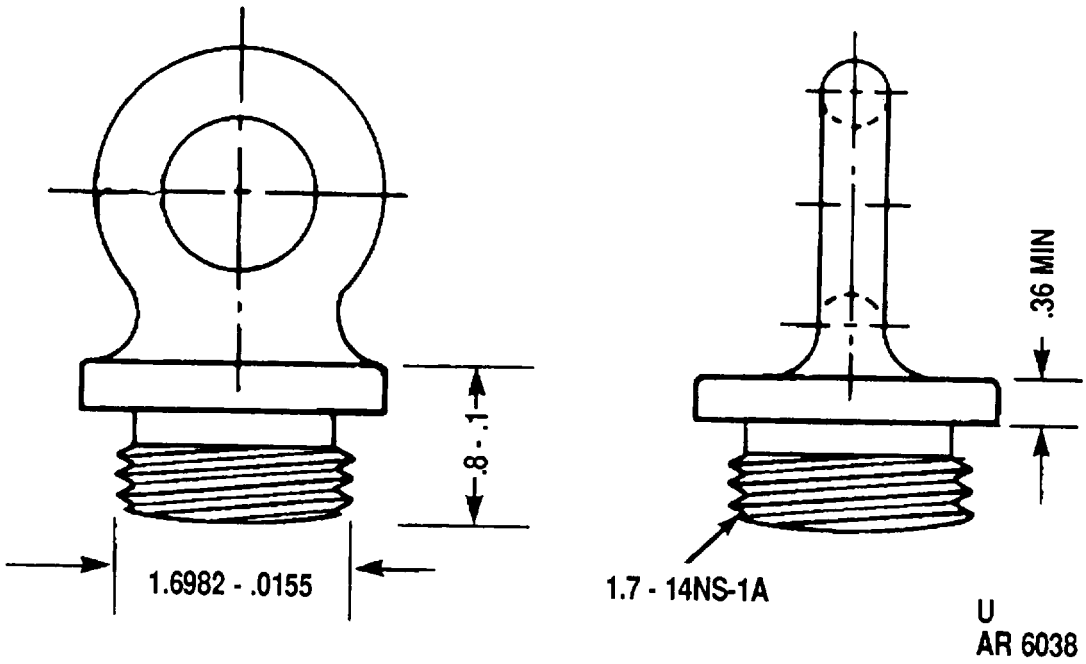
PLUG, LIFTING - TYPE C



Description:

Lifting plug type C is for the older 155mm projectiles that have the fuze well thread size of 1.7-14NS-lA major diameter 1.6982 -.0155.

Drawing number ---------- 75-14.42B steel casting. Or malleable iron casting
NSN l320-00-861-2098

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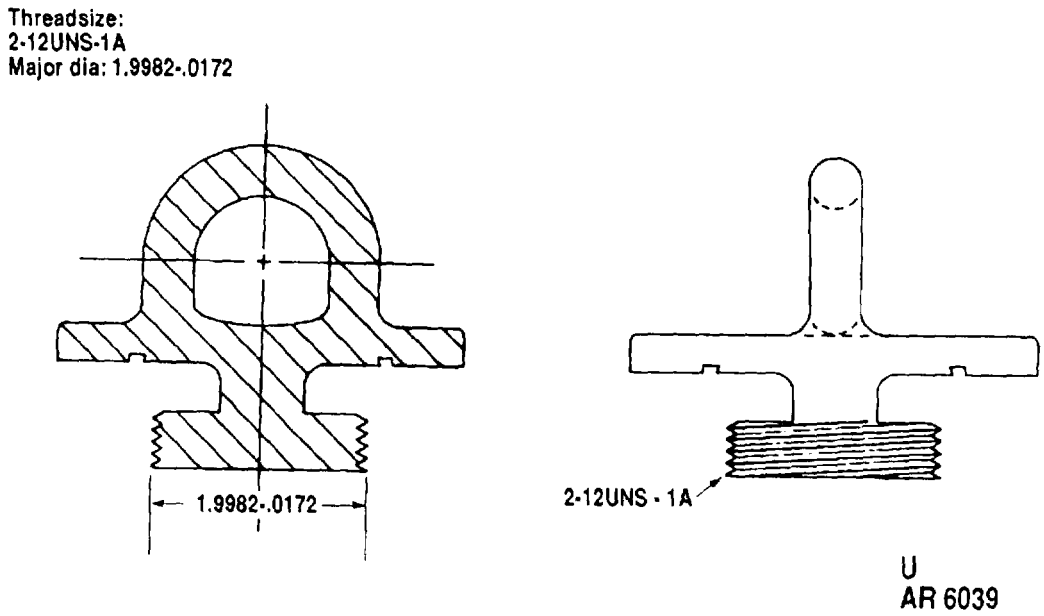
PLUG, LIFTING: ENERGY-ABSORBING FOR THE 155MM PROJECTILES M549/M549Al



Description:

The M549/M549Al projectiles have the energy-absorbing lifting plug designed to protect the projectile fuze area against accidental damage. The new plug has an oversized 3-3/4 inch (9.53 cm) flange. If this lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile cannot be fuzed. No attempt should be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point,

Material	Malleable Iron Grade-M
Drawing number	9326791
N S N	1320-01-065-9830

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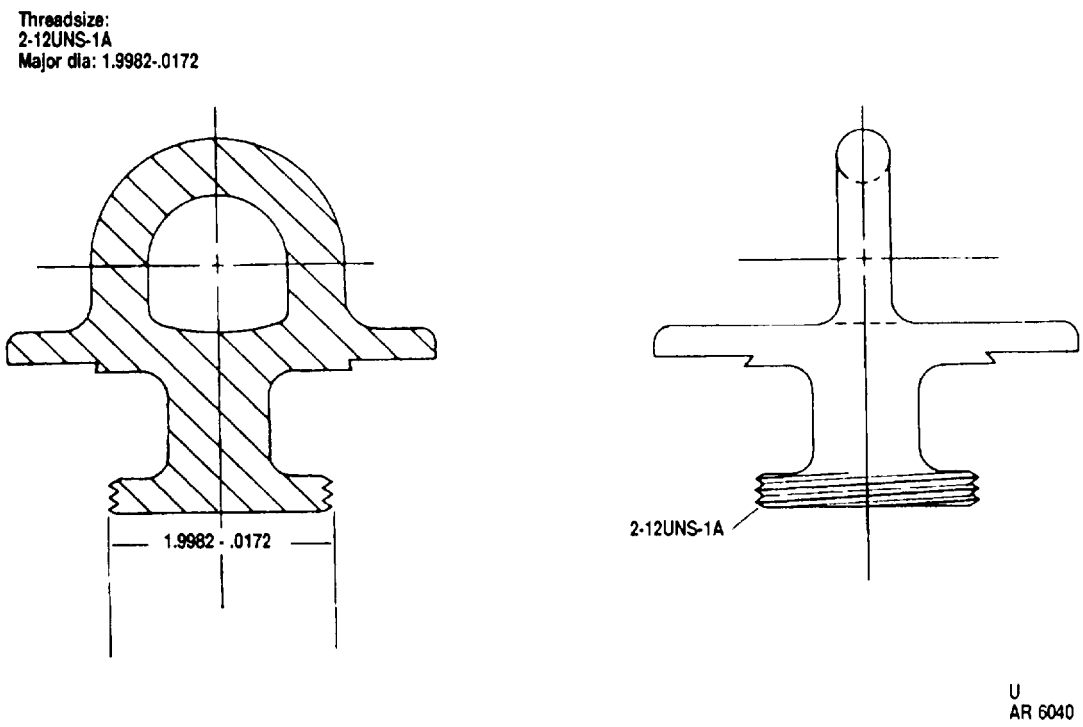
PLUG, LIFTING: SHOCK ATTENUATING FOR 155MM PROJECTILES M549A1 AND M795 AND THE 8-INCH PROJECTILE M106



Description:

Lifting plug shock attenuating has an oversized flange size 3.80-inches (9.65 cm), to protect the projectile fuze area against accidental damage. If this lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile cannot be fuzed. No attempt should be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point.

Material	Malleable Iron Grade - M3210
Drawing Number	9341742
NSN	l320-01-10-l08-7826
Gasket Lifting Plug	5330-0l-354-6972

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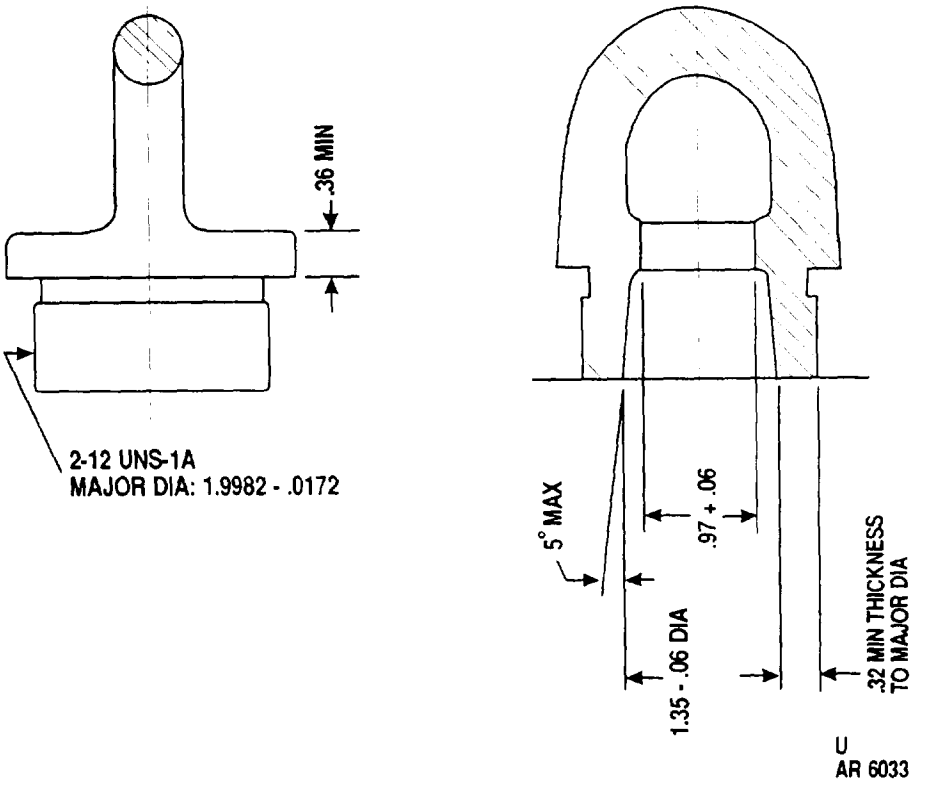
PLUG, LIFTING: FUSIBLE FOR 155MM AND 8-INCH PROJECTILES



Description:

Lifting plug fusible has an eutectic alloy filled cavity in the neck area to prevent the payload in ICM rounds from being ejected accidentally at the base, The alloy will melt and vent out the pressure built-up by the burning expelling charge.

Material	Malleable Iron Casting, Grade — M3210
Drawing Number	9215390

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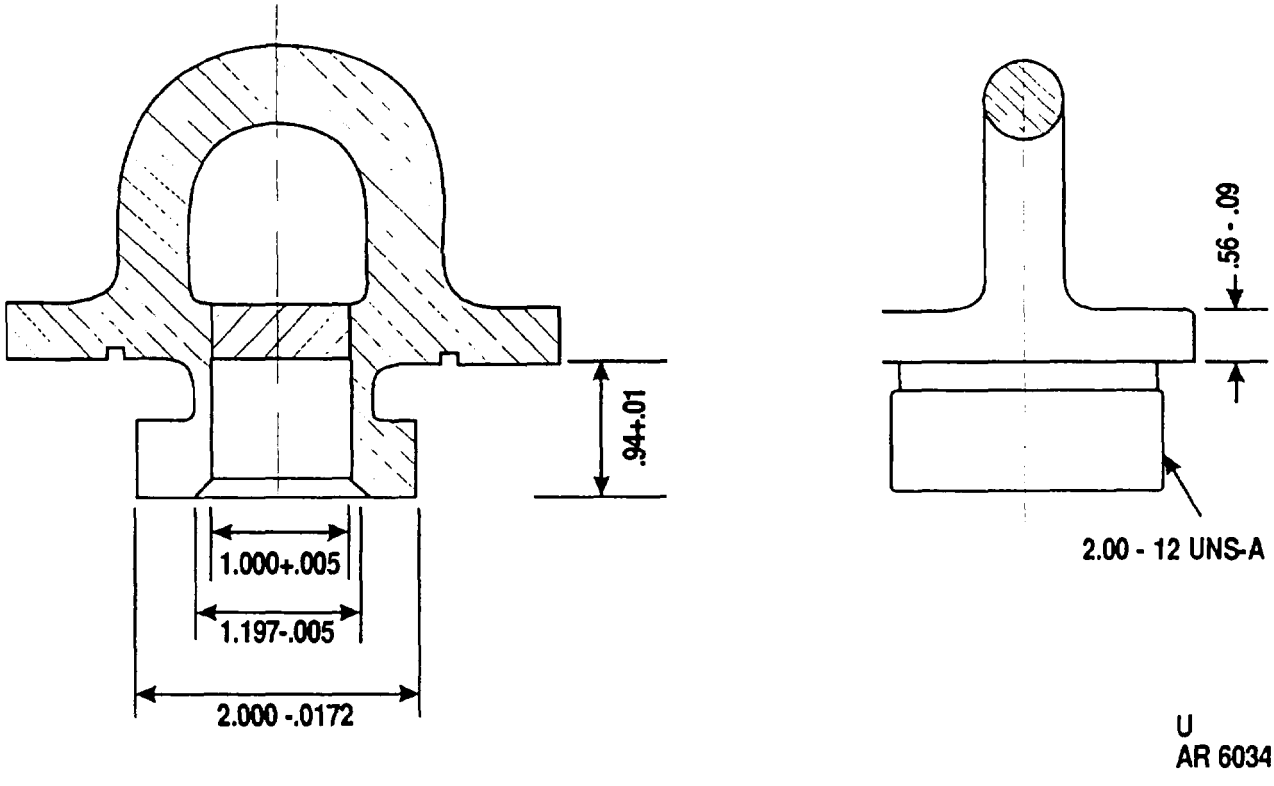
PLUG, LIFTING: UNIVERSAL



Description:

Lifting plug universal has an oversized flange size 3.80-inches (9.65 cm), to protect the projectile fuze area against accidental damage. If this lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile cannot be fuzed. No attempt should be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point. In addition, the cavity in the neck area is filled with an eutectic alloy to permit pressure venting in case expelling charge gets ignited accidentally and thus it prevents the cargo from being expelled at the base of the projectile.

Material	Malleable Iron M3210
Drawing Number	9345325
NON	1320-01-220-2166
Filler, Packing, Preformed (Gasket)	1320-01-272-0971

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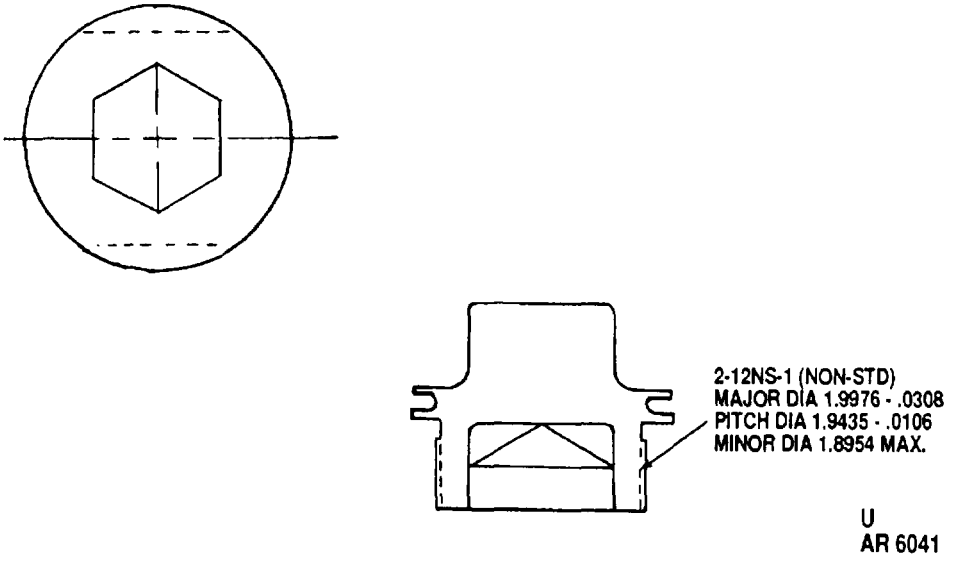
CLOSING PLUGS



Type Classification:

Std.

Use:

To protect projectile filler from foreign matter and retain supplementary charges.

Description:

Closing plugs are used on projectiles when they are shipped without a fuze assembled to the round. When shipped with a closing plug, a chip board spacer is assembled between the supplementary charge and plug to limit movement of the supplementary charge during transportation and handling.

Closing plugs are inserted in the nose of the projectile at the ammunition loading plants in lieu of a fuze, prior to shipment to the Ammunition Supply Point (ASP).

Tabulated Data:

Closing Plug	Used with 81mm, M362 and M374 Series 4.2 Inch, M329A1/A2 105mm: HE, M1
Thread size	2.12NS-1
Material	Aluminum Alloy
Drawing No.	7549009
NSN	1315-00-821-6608
Closing Plug	Used with 75111111: HE M48; 90mm, HE, M71/M71A1; 105mm, HE, M1
Thread size	2.12NS-1
Material	Steel FS-B1112
Drawing No.	75-14-309
NSN	1315-00-400-7244

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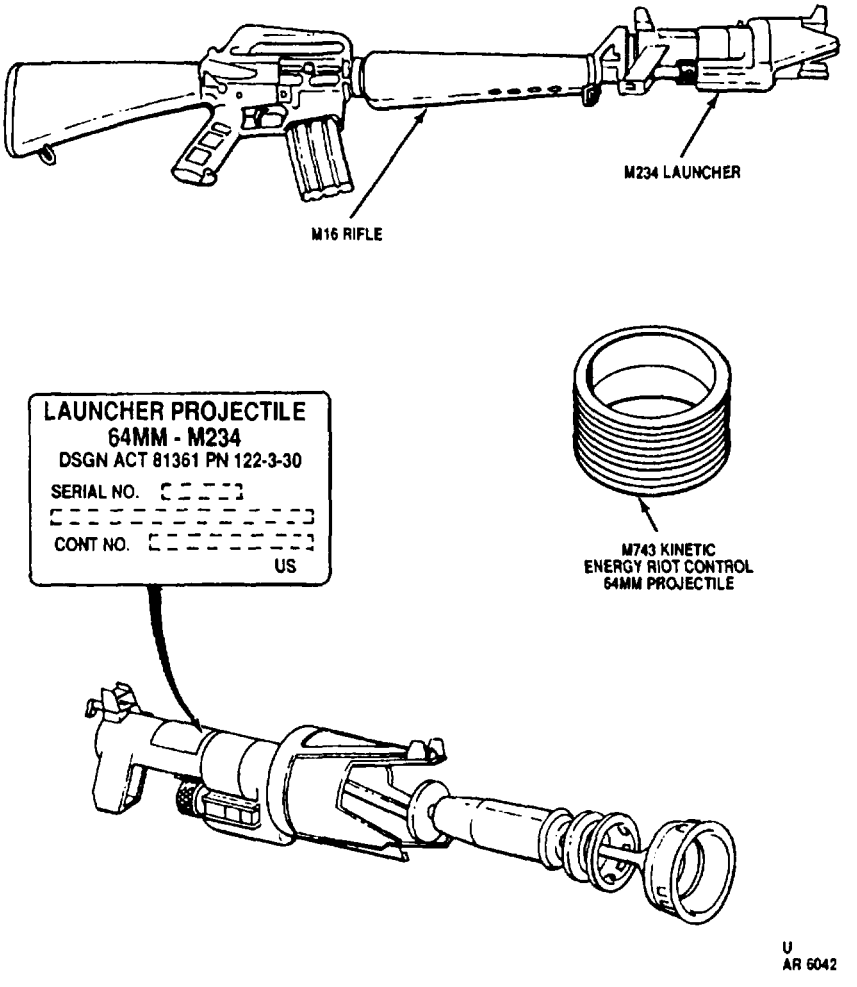
PROJECTILE 64MM: CS M742, KE M743, WITH LAUNCHER M234



Type Classification:

M742 - STD - MSR 06826006.
M743 - STD - MSR 04786005.

Use:

These projectiles used with their launcher are for riot control and also to protect property during civil disturbance.

Description:

The two projectiles used with the launcher are the M742 CS riot-control 64mm projectile and the M743 kinetic-energy riot-control 64mm projectile. The projectiles are one-piece molded bodies of rubber-like plastic material, 64mm in diameter, with an airfoil cross section similar to a thick airplane wing. Upon launch, the airfoil shape of the spinning projectile produces lift enabling it to overcome gravity and follow a relatively flat trajectory. Due to the low profile drag, the projectile has nearly the same impact energy at intended ranges as it has at launch. The M743 kinetic-energy projectile is identical to the M742 projectile in size and shape but it is wrapped with a white breakband. This breakband will break u on impact with the target allowing the projectile to deform into a flat shape. This action spreads the impact forces over a large area to minimize the possibility of producing serious injury.

The M234 launcher is a cylindrical, aluminum casting which weighs about 1 kilogram and is about 32 centimeters long. Below the main barrel is a shorter chamber with a nut and latch mechanism which holds the launcher

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on the barrel of the M16A1 rifle. Forward and aft sights are mounted on the top of the launcher. An upper arm and a buffer housing on the rear of the launcher mate with the rifle forward sight and bayonet stud to keep the launcher from turning on the rifle barrel. A cylindrical plate closes the rear of the launcher barrel and is held in place by a connecting ring. A ball-detent assembly holds the launching cup-buffer assembly in the retracted position. This cup-buffer assembly consists of a launching cup attached to a threaded shaft. A manifold and buffer fit on the shaft and are held on the shaft by a threaded buffer plate. The manifold ring assembly is inserted to hold the launcher cup-buffer assembly in the launcher. The launcher barrel has three rifling grooves and the cup has three matching keys which give s in to the projectile as it is propelled from the launcher.

The M755 blank cartridge, with its tip painted a bright yellow, is used the M16A1 rifle. This special blank cartridge is loaded with just enough powder to propel the projectile to the target area. The M755 blank cartridge is for use only with this system (Ring Airfoil Grenade) (RAG). Use of any other ammunition or blank cartridge could result in serious injury or death to personnel.

Functioning:

The M234 launcher is attached to the flash suppressor on the M16A1 rifle. When fired in the rifle, an M755 blank cartridge, which is issued with each projectile, supplies propellant gases to the launcher to propel the RAG projectile at a velocity of about 60 meters per second and a spin rate of about 5,000 rpm. The ring airfoil shaping of the 64mm-diameter, 34-gram, soft rubber-like projectile results in a relatively flat trajectory. Each launcher is capable of firing from four to six projectiles per minute. The launcher and projectiles will be issued when authorized during civil disturbances when target selectivity and accuracy are important considerations. The velocity is sufficiently high to prevent dodging by target individuals at effective ranges. The effective range of the projectile is 40 meters on an individual and 60 meters on groups of individuals with a maximum range of 100 meters. The M743 projectile has sufficient momentum to cause pain and discomfort with minimum possibility of producing injury to any part of the body. It will deter rioters and keep them at such a distance that they would not reach the control forces with thrown rocks or debris.

Tabulated Data:

Projectile M742 and M743:
- Diameter ---------- 2.52 in. (64mm)
- Length ---------- 1.34 in. (3.40 cm)
- Weight ---------- 1.22 oz (34.50 g)
- Filler M742:
  - CSI ---------- 2g

Launcher M234:
- Length ---------- 10.9 in. (27.69 cm)
- Weight ---------- 2.06 lb (0.93 kg)
- Width ---------- 3.4 in. (8.64 cm)
- NSN ---------- 1010-01-014-6506

Cartridge M755:
- Diameter ---------- 5.56mm
- Length ---------- 1.90 in. (48.3 mm)
- Weight ---------- 112 grains
- Propellant Hi Skor 700X ----- 12 grains
- Muzzle velocity ---------- 172 to 198 fps
- Max range ---------- 100 meters (328 ft)

Packing:

Projectile 64mm: Riot Control, CS, M742w/Ctg M755:
- DODAC ---------- 1310-B639
- Unit Pack ---------- 6 projectiles and 6 blank cartridges are stored and issued in a carrier.

Projectile 64mm: Riot Control Kinetic Energy M7433 w/Ctg M755:
- DODAC ---------- 1310-B638
- Unit Pack ---------- 6 projectiles and 6 blank cartridges are stored and issued in a carrier.

Performance:

Effective range of projectile:
- Maximum range ---------- 100 meters
- On groups of individuals ------ 60 meters
- On individual ---------- 40 meters
- Rate of fire ---------- 4-8 projectiles per minute

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Shipping and Storage Data:

Projectile 64mm: CS M742

Storage class	1.4 G
DOT class	C
DOT designation	SMALL ARMS AMMUNITION IRRITATING (TEAR GAS) CARTRIDGES

Projectile 64mm: M743

Storage class	1.4S
DOT class	C
DOT designation	SMALL ARMS AMMUNITION

Reference:

TM 9-1010-224-10

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APPENDIX A

REFERENCES

A-1. Scope

This appendix should be consulted frequently for latest changes or revisions of references and for new publications relating to the material covered in this manual.

A-2. Equipment Publications

Operator's and Organizational Maintenance Manual for Rifle, Recoilless, 106MM: M40A2 and M40A4	TM 9-1000-205-12
Operator's Manual for Grenade Launcher, 40MM, M79	TM 9-1010-205-10
Operator's Manual for 40MM Grenade Launcher, M203	TM 9-1010-221-10
Operator's Manual for Lightweight Company Mortar, 60MM, M224	TM 9-1010-223-10
Operator's Manual for Launcher, Projectile, 64MM: Riot Control, M234....	TM 9-1010-224-10
Operator's Manual for Machine Gun, 40MM, MK, MOD 3	TM 9-1010-230-10
Organizational and Intermediate Direct Maintenance Manual with RPSTL for Machine Gun, 40MM, MK 19, MOD 3	TM 9-1010-230-23&P
Operator's Manual for Mortar, 81MM, M29A1 (NSN 1015-00-999-7794)	TM 9-1015-200-10
Operator and Organizational Maintenance Manual for Howitzer Light: Towed, 105MM, M101A1	TM 9-1015-203-12
Operator's Manual for 4.2-Inch Mortar, M30	TM 9-1015-215-10
Organizational Maintenance Manual (Including RPSTL) for Mortar, 4.2-Inch M30 (Cannon M30 on Mount M24A1) and Trainer, Subcaliber, 60MM: M31.	TM 9-1015-215-20&P
Direct Support Maintenance Manual for Mortar, 4.2 Inch: M3 (Cannon, M30 on Mount, M24A1) and Trainer, Subcaliber, 60MM, M31	TM 9-1015-215-30
Direct Support Maintenance RPSTL (Including Depot Maintenance Repair Parts) for Mortar 4.2-Inch, M30 (Cannon M30 on Mount, M24A1) and Trainer, Subcaliber, 60MM, M31	TM 9-1015 -215-30P
Operator and Organizational Maintenance Manual for 90MM Recoilless Rifle: M67 W/E	TM 9-1015-223-12
Operator's Maintenance Manual for Howitzer, Light, Towed: 105MM, M102	TM 9-1015-234-10
Operator's Manual for Mortar, 81MM, M252	TM 9-1015-249-10
Operator's and Organizational Maintenance Manual for Howitzer, Medium, 155MM: M114, M114A1, and M114A2 (Including RPSTL)	TM 9-1025-200-12&P
Operator's Manual for Howitzer, Medium, Towed: 155MM, M198	TM 9-1025-211-10
Operator's Manual for M422 Nuclear Projectile	TM 9-1100-218-10
Ammunition and Explosives Standards	TM 9-1300-206
Ammunition Maintenance	TM 9-1300-250
Unit Maintenance Manual (Including RPSTL) for Artillery Ammunition for Guns, Howitzers, Mortars, Recoilless Rifles, and 40MM Grenade Launchers	TM 9-1300-251-20
Direct Support and General Support Maintenance Manual (Including RPSTL) for Artillery Ammunition for Guns, Howitzers, Mortars, Recoilless Rifles, and 40MM Grenade Launchers	TM 9-1300-251-34

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Operator's and Organizational Maintenance Manual (Including RPSTL) for 160MM Mortar Training Device - 60MM Sabot (Inert) M3 and 22MM Subcaliber, Practice Cartridge, M744, M745, M746 and M747	TM 9-1310-249-12&P
Operator and Unit Maintenance Manual for Cartridge 81 MM: Target Practice (SR), M880 (Including RPSTL)	TM 9-1315-252-12&P
Operator and Unit Maintenance Manual (Including RPSTL) for Launcher and Cartridge, 84MM: M136 (AT4)	TM 9-1315-886-12
Operator's Manual for Gun, Field Artillery, SP, 175MM: M107 and Howitzer, Heavy SP 8-Inch: M110	TM 9-2300-216-10
Operator's Manual: Carrier, Personnel: Full-Tracked, Armored, M113A1; and M113A2; Carrier, Command Post, Light, Tracked: M577A1; and M577A2; Carrier, Mortar, 107MM, Self-propelled; M106A1 and M106A2, Carrier, Mortar, 81 MM, Self-propelled, M125A1 and M125A2 and Carrier, Flame Thrower, Self-propelled: M132A1	TM 9-2300-257-10
Operator's Manual for Operator Controls Preventive Maintenance Check Sheet for Vehicle, Combat Engineer, Full-Tracked: M728	TM 9-2350-222-10-1
Operator's Manual for Operation Under Usual and Unusual Conditions for Vehicle, Combat Engineer, Full-Tracked: M728	TM 9-2350-222-10-2
Operator's Manual for Troubleshooting and Maintenance for Vehicle, Combat Engineer, Full-Tracked: M728	TM 9-2350-222-10-3
Operator's Manual (Crew) for Armored Reconnaissance/Airborne Assault Vehicle, Full-Tracked, 152MM Gun/Launcher M551 and M551A1	TM 9-2350-230-10
Operator's and Organizational Maintenance Manual: Armored Reconnaissance/Airborne Assault Vehicle: Full-Tracked, 152MM Gun/Launcher, M155A1.	TM 9-2350-230-12
Operator's Manual: Tank, Combat, Full-Tracked: 152MM Gun/Launcher, M60A2 W/E	TM 9-2350-232-10
Operator's Manual for Tank, Combat, Full-Tracked: 105MM Gun, M60A3 (Tank Thermal Sight) TTS	TM 9-2350-253-10
Operator Controls, PMCS, and Operation Under Usual Conditions, Volume 1 of 2: Tank, Combat, Full-Tracked: 105MM Gun, M1, Tank, Combat, Full-Tracked: 105MM Gun, 1PM1 General Abrams	TM 9-2350-255-10-1
Operator's Manual for Operation Under Unusual Conditions, Maintenance and Ammunition, Volume 2 of 2: Tank, Combat, Full-Tracked: 105MM Gun, M1, Tank, Combat, Full-Tracked: 105MM Gun, 1PM1 General Abrams	TM 9-2350-255-10-2
Operator's Manual, Operator Controls and PMCS Tank, Combat, Full-Tracked: 105MM Gun M60A1 (RISE) Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE PASSIVE).	TM 9-2350-257-10-1
Operator's Manual for Operation Under Usual and Unusual Conditions for Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE) and M60A1 (RISE PASSIVE).	TM 9-2350-257-10-2
Operator's Manual for Troubleshooting, and Maintenance for Tank, Combat, Full-Tracked: 105MM Gun, M50A1 (RISE) Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE PASSIVE)	TM 9-2350-257-10-3
Operator's Manual for Howitzer, Heavy Self-Propelled, 8-Inch M110A2	TM 9-2350-304-10
Operator's Manual for Howitzer, Medium, Self-Propelled, 155MM, M109A2, M155MM, M109A3, 155MM, M109A4 and 155MM, M109A5	TM 9-2350-311-10
Field Maintenance for 60MM Mortars, M2 and M19: 60MM Mortar Mount: M2: 60MM Mortar Baseplate, M1: 81MM Mortar and Mounts, M4, M23A1, M23A2 and M23A3.	TM 9-3071-1

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Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes . . . . . TM 43-0001-28
Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes (U) . . . . (C) TM 43-0001-28-1
Army Ammunition Data Sheets for Guns, Howitzers, Mortars, Interoperable Ammunition . . . . . TM 43-0001-28-3
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Heavy Self-Propelled, 8-Inch: M110A2 w/Cannon, M201A1 . . . . . TM 43-0001-28-4
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Gun, Self-Propelled, 175MM: M107 w/Cannon, M113 and M113Al . . . . . TM 43-0001-28-5
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Self-Propelled, 155MM: M109A2, M109A3, M109A4 w/Cannon, M185 . . . . . TM 43-0001-28-6
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M198 w/Cannon, M199 . . . . . TM 43-0001-28-7
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M114A2 w/Cannon, M1A2 and Howitzer, Medium Self-Propelled 155 MM: M109 w/Cannon, M126A1 . . . . . TM 43-0001-28-8
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M114A1 w/Cannon, M1A1 . . . . . TM 43-0001-28-9
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Light, Towed, 105MM: M101, M101A1 and M102 . . . . . TM 43-0001-28-10
Procedures for Destruction of Approved Conventional Ammunition (ICM) to Prevent Enemy Use . . . . . TM 43-0002-33

A-3. Firing Tables

Firing Table Addendum to FT 144-ADD-K-1 for Howitzer Organizational, Medium, Self-propelled, 155MM, M109, M109A1 . . . . . FT 155-ADD-K-1
Cannon, 155MM Howitzer, M185 on Howitzer, Medium, Self-propelled, 155MM, 109A1 and Howitzer, Medium, Self-propelled, 155MM, 109A1B Firing Projectile, HE, M483A1 . . . . . FT 155-AN-1

A-4. Special Requirements

Complete Round Charts - Artillery Ammunition . . . . . AMC-P 700-3-3
DOD Consolidated Ammunition Catalog (AMMO 1-2-3) . . . . . SB 708-4

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A-5. Supply Publications

Army Adopted/Other Items Selected for Authorization/List of Reportable Items. . . . . SB 700-20
FSC GROUP 13: Ammunition and Explosives: (Classes 1340-1398) . . . . . SC 1340/98-IL

A-6. Training Publications

Mortars (TO 11W2-5-13-21) . . . . . FM 23-90
Field Artillery Manual Cannon Gunnery . . . . . TC 6-40

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APPENDIX B
CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS

SECTION I. INTRODUCTION

B-1. SCOPE

This appendix contains a comprehensive listing of authorized cartridge/projectile fuze and propelling charge combinations, artillery type of conventional ammunition. These lists (i.e. charts) supersede the fuze and propelling charge combinations referenced on the data sheets.

B-2. LIST OF CHARTS FOR AUTHORIZED CARTRIDGE/PROJECTILE FUZE AND PROPELLING CHARGE COMBINATIONS

a. Section II - Cartridge/Projectile-Fuze Combinations for Guns.

b. Section III - Cartridge/Projectile-Fuze Combinations for 75MM, 105MM, and 8 Inch Howitzers.

c. Section IV - Projectile/Fuze Combinations for 155MM Howitzers.

d. Section V - Cartridge-Fuze Combina tions for Mortars.

e. Section VI - Cartridge-Fuze Combinations for Recoilless Rifles.

f. Section VII - Authorized Projectile/ Propelling Combinations for M1A1 Cannon Tube (155MM).

g. Section VIII - Authorized Projectile/ Propelling Charge Combinations for MlA2 Cannon Tube and M126A1 Cannon Tube (155MM).

h. Section IX - Authorized Projectile/ Propelling Charge Combinations for M185/M284 Cannon Tubes (155MM).

i. Section X - Authorized Projectile/ Propelling Charge Combinations for M199 Cannon Tube (155MM).

g. Section XI - Authorized Projectile/ Propelling Charge Combinations for 8 Inch Howitzers.

B-3. PRECAUTIONS

Precautions and restrictions to be observed in handling fuzes and firing ammunition with the cartridge/projectile fuze combinations indicated in this appendix are published in the applicable weapon manuals.

A-4. KEY TO ABBREVIATIONS AND SYMBOLS

●	Authorized
X	Authorized
APC	Armor piercing capped
APERS	Antipersonnel
AT	Antitank
BD	Base detonating
BE	Base ejection
CLD	Colored smoke
CP	Concrete piercing
CS	Tactical riot control agent
ET	Electronic time
GB	Nonpersistent toxic (casualty) nerve gas
H	Mustard gas
HC	White smoke
HA	Distilled mustard gas
HE	High explosive
HEAT	High explosive antitank
HEAT-T-MP	High explosive antitank with tracer, multipurpose
HEI	High explosive incendiary
HERA	High explosive rocket assisted
HEP	High explosive plastic
ICM	Improved conventional munitions
llum	Illuminating
LCC	Logistic control code
Mod	Modified
MT	Mechanical time
MTSQ	Mechanical time and superquick
P	Authorized, requires removal of supplementary charge if present
PD	Point detonating
PI	Point initiating
PIBD	Point initiating, base detonating
Prox	Proximity
SD	Self destroying
T	Time fuze or for training use only -T With tracer
TP	Target practice
TSQ	Time superquick
VX	Persistent toxic (casualty) nerve gas
WE	White phosphorus

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SECTION II
CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR GUNS

CANNON (Weapon)	Cartridge/Projectile	FUZE: PD: M48A3	PD: M51A5	PD: M64A1	PD: M78 Series (CP)	PD: M557	PD: M572	PD: MK27 MOD 1*	PD: M720	PD: M739	PD: M761	PIBD: M509 Series	PIBD: M539	PIBD: M764	MT: M571	MT: M711	MTSQ: M501 Series	MTSQ: M564	MTSQ: M582 Series	BD: M62 Series	BD: M534 Series	BD: M578	PROX: M513 Series	PROX: M728/M514A3	PROX: M732	PROX: M766
40 Millimeter Ml, M2 (M42, M42A1)	HE-T, HEI-T, MK2, SD MK11, M3A1							X																		
	HE-T, MK2, SD, M3			X																						
40 Millimeter DIVADS HE, M822 (Sgt York)	HE-I, M811										X															
	HE, M822																									X
90 Millimeter M1, M2 (M36, M48 M54 Tanks)	APERS, M580															X										
	HE, M71 (Normal Cavity)		X		X	X												X								
	HE, M71 (Deep Cavity)		X		X	X												X					P			
	HE-T, M71A1		X			X												X								
	HEAT, M348 SERIES											X														
	HEAT-T, M431											X														
	HEP-T, T142 SERIES																				X					
	SMOKE, WP, M313 SERIES	X															X									
105 Millimeter M68 (M60A1 Tank)	APERS-T, M494														X											
	HEAT-T, M456 SERIES											X														
	HEP-T, M393 SERIES																				X	X				
	SMOKE,WP-T M416																				X					
120 Millimeter	HEAT-MP-T, M830													X												
152 Millimeter M81, M162 (M60A2 Tank M551 Recon)	HE-T, M657								X																	
	HEAT-T-MP, M409 SERIES												X													
	TP-T, M411 (XM411E3)					X																				
165 Millimeter M135 (M728)	HEP, M123A1																			X						
175 Millimeter M113 (M107)	HE, M437 SERIES (Deep Cavity)						X			X									X					P	X	
	HE, M437 (Shallow Cavity)						X			X									X						X	

*Firing of 40mm MK2 Cartridges with MK27 MOD 0 Fuzes is not authorized.

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SECTION III
CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR 75MM, 105MM AND 8 INCH HOWITZER

CANNON (Weapon)	Cartridge/Projectile	FUZE																				
		PD					MT			MTSQ						BD		PROX			ET	
		MK399 MOD 1	M78 Series (CP)	M557	M572	M739 Series	M563	M565	M565 (MOD)	M501 Series	M548 (MOD)	M548	M564	M577 Series	M582 Series	M62 Series	M91 Series	M513 Series*	M728*	M732	M762	M767
75 Millimeter M3 (for M1A1)	HE, M48 (Normal Cavity)			X																		
	HE, M48 (Deep Cavity)			X														P				
105 Millimeter M2A1 M2A2 (Towed M101/A1) M137 (Towed M102) M49 (SP M52)	APERS-T, M546						X															
	BE, M84, M84B1									X												
	BE, HC, M84A1							X				X		X							Z	
	GB, M360			X		X																
	HE, M1 (Normal Cavity)	X	X	X		X							X		X					X		X
	HE, M1 (Deep Cavity)	X	X	X		X							X		X			P	P	X		X
	HE, M444								X		X											
	TACTICAL, CS, M629							X				X										
	HEP-T, M327															X	X					
	HE, RA, M548			X		X									X				P			X
	ILLUM, M314A2, M314A1									X												
	ILLUM, M314A3							X				X		X							X	
	GAS, H, M60			X		X																
	SMK, WP, M60 SERIES			X		X							X		X							X
	TP M67															X	X					
8 Inch (Towed M115) M2A1, M2A2 (SP M110)	Agent, GB or VX M426			X		X													C			
	HE, M106 (Normal Cavity)	X		X		X							X		X					X		X
	HE, M106 (Deep Cavity)	X		X		X							X		X				P	X		X
	HE, M404 ICM							X						X							X	
8 Inch M201 (M110A1) 8 Inch M201A1 (M110A2)	HE, M106 (Normal Cavity)	X		X	X	X							X		X					X		X
	HE, M106 (Deep Cavity)	X		X	X	X							X		X				P	X		X
	HE, M404 ICM							X						X							Z	
	HERA, M650 Rocket On			X	X	X																C
	HERA, M650 Rocket Off			X	X	X							X		X					X		X
	HE, M509A1 ICM													X							X	
	Agent, GBM VX, M426			X		X													C			

*M728 and M513 Series Fuzes cannot be tired with Zone 7 Propelling Charge for 105MM Cartridge.
C = COMBAT EMERGENCY USE ONLY
P = SUPPLEMENTARY CHARGE MUST BE REMOVED TO MAKE ROOM FOR LONG INTRUSION FUZE
Z = AUTHORIZED FOR ZONE 7

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SECTION IV
PROJECTILE/FUZE COMBINATIONS FOR 155 MM HOWITZER

CANNON (Weapon)	Projectile	FUZE: PD: MK399 MOD 1	PD: M557/M572	PD: M739 Series	MT: M565	MTSQ: M501 Series	MTSQ: M564	MTSQ: M577 Series	MTSQ: M582 Series	PROX: M728	PROX: M732	PROX: M514 Series	ET: M762	ET: M767
M1A1 (for M114A1 Towed Howitzer)	AGENT, H, HD, M110		X	X			X		X					X
	AGENT GB, VX, M121A1		X	X						CP	C			
	HE, M107 (Normal Cavity)	X	X	X			X		X		X			X
	HE, M107 (Deep Cavity)	X	X	X			X		X	P	X	MP		X
	HE, M449 Series				X			X					X	
	SMK, HC, BE, M116A1				X			X					X	
	SMK, HC&CLD BE, M116, M116B1					X								
	SMK, WP, M110 Series		X	X			X		X					X
	ILLUM, M485 Series				X			X					X	
	PRACTICE, M804		X	X			X		X		X			X
	PRACTICE, M804A1		X	X			X		X					X
M1A2 (for M114A2 Towed Howitzer M126/M126A1) (for M109 SP Howitzer)	AGENT, H, HD, M110		X	X			X		X					X
	AGENT, GB, VX, M121A1		X	X						CP	C			X
	HE, M107 (Normal Cavity)	X	X	X			X		X		X			X
	HE, M107 (Deep Cavity)	X	X	X			X		X	P	X	MP		X
	HERA, M549/M549A1		X	X					X					X
	HE, M449 Series				X			X					X	
	HE, M483A1							S					X	
	HE, M692/M731							X					X	
	AT, M718/M741 Series							X					X	
	SMK, HC, BE, M116A1				X			X					X	
	SMK, HC&CLD BE, M116, M116B1					X								
	SMK, WP, M110 Series		X	X			X		X					X
	ILLUM, M485 Series				X			X					X	
	PRACTICE, M804		X	X			X		X		X			X
	PRACTICE, M804A1		X	X			X		X					X
	SMOKE, WP, M825, M825A1							X					X	
	EXTENDED RANGE, DP, M864							S					X	
	AGENT, GB2, M687		X	X										
	HEAT, M712 COPPERHEAD	FUZE IS INTEGRAL PART OF PROJECTILE												

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SECTION VI
CARTRIDGE-FUZE COMBINATIONS FOR RECOILLESS RIFLES

CANNON (Weapon)	Cartridge	FUZE						
		PD	PI			MT	BD	
		M503 Series	M90 Series	M509 Series (BD)	M530 Series (BD)	M592 Series	M62 Series	M91Series
57 Millimeter Rifle M18, M18A1	HE, M306	X						
	HE, M306A1	X						
	HEAT, M307 SERIES		X					
	SMOKE, WP, M308	X						
	SMOKE, WP, M308A1	X						
	TP, M306A1	X						
75 Millimeter Rifle M20	HEAT, M310						X	
	HEAT-T, M310A1							X
90 Millimeter Rifle M67	HEAT, M371 SERIES				X			
	PRACTICE, M371				X			
105 Millimeter Rifle M27, M27A1	HEP-T, M326							X
106 Millimeter Rifle M40A6 M40A4	APERS-T, M581					X		
	HEAT, M344 SERIES			X				
	HEP-T, M346 SERIES							X

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SECTION VII
AUTHORIZED PROJECTILE/PROPELLING COMBINATIONS FOR * M1A1 CANNON TUBE (155MM)

Projectiles	Propelling Charge (Green Bag) M3 & M3A1 Zone 1	2	3	4	5	(White Bag) M4A1 & M4A2 Zone 3	4	5	6	7	Firing Limitations
HE, M107	X	X	X	X	X	X	X	X	X	X	
HE, M449 SERIES ICM	X	X	X	X	X	X	X	X	X	X	
ILLUM, M485A1 & A2	X	X	X	X	X	X	X	X	X	X	M485A1/A2 Projectiles not reliable when fired at charges 6 and 7 with fuze settings of 10 seconds or less
AGENT H, HD, M110	X	X	X	X	X	X	X	X	X	X	M110 Agent burster loaded with tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)
AGENT (GB or VX) M121A1	X	X	X	X	X	X	X	X	X	X	M121 Agent burster loaded with tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C) (M121A1 Projectile burster is loaded with Comp B)
SMOKE, WP, M110 (M110E1) M110A1 (M110E2) M110A2 (M110E3)	X	X	X	X	X	X	X	X	X	X	M110 (M110E1) burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F(+52°C)M110A1&A2 Burster loaded with Comp B)
SMOKE HC,BE,M116A1	X	X	X	X	X	X	X	X	X	X	
SMOKE HC, CLD, BE, M116, M116B1	X	X	X	X	X	X	X	X	X	X	**Overhead Fire Restrictions
PRACTICE, M804	X	X	X	X	X	X	X	X	X	X	

* Primer M2A4 is the only authorized primer to be used with M 1A 1 Cannon tube
** M116 and M116B1 restricted from overhead fire with zone 7 of M4A1 and M4A2 charges due to possible base plate separations creating downrange safety hazard.

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SECTION X
AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR Ml99 CANNON TUBE (155MM) continued

Projectiles	Propelling Charge										M119	M110A1	M119A2	M203/M203A1 Zone 8S**	Firing Limitations
	(Green Bag) M3 & M3A1					(White Bag) M4A1 & M4A2									
	Zone					Zone									
	1	2	3	4	5	3	4	5	6	7					
HERA, M549	No[1]	No	No	No	No	No	No	No	No	x	No	x	x	No	M549 must never be fired with M203 charge****
HERA, M549A1	No	No	No	No	No	No	No	No	No	x	No	x	x	x	M549 must never be fired with M203 charge****
PRACTICE, M804	No[1]	x	x	x	x	x	x	x	x	x	x	x	x	No	
HE, M795[3]	No[1]	No	x	x	x	x	x	x	x	x	x	x	x	No	
HEAT, M712 (Copperhead)	No[1]	No	No	x	x	No	x	x	x	x	x	x	x	No	
SMOKE, WP,[2] M825/M825A1	No	No	x	x	x	x	x	x	x	x	x	x	x	x	Firing below charge 3 may result in stickers. M825 projectiles are restricted to firing below 950 mils elevation with the M203 charge. Firing this combination at elevations exceeding 950 mils may result in short rounds. This limitation does not apply to M825A1 projectile.
HE, ICM, M864 Extended Range										x	x	x	x	x	Firing below charge 3 may result in stickers. The M864 shall be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available.

* M116 and M116B1 restricted from overhead fire with Zone 7 of M4A1 and M4A2. Charge due to possible base plate separation creating down range safety hazard.

** M728 Proximity Fuse cannot be fired w/Zone 8's. M203 Propelling Charge

*** The M119A2 Charge Zone 7 is equivalent to M119/M119A1 Charge Zone 8. Refer to firing tables for small differences in velocity which affect range.

****Rocket On Firing Only.

1 Firing at Chg 2 may result in sticker occasionally.

2 M825 projectiles (manufactured Jan 85-May 86) fired at temperatures above +110°F (+43°C) (WP liquidified) have resulted in flight instability and short rounds. This instability does not occur below +110°F (+43°C) (WP solid). This restriction does not apply to the the M825A1 projectile.

Projectile M795 is not in production.

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SECTION XI
AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR 8 INCH HOWITZERS

Weapon	Cannon	Projectile	Propelling Charge										
			M1					M2			M188	M188A1	
			Zone					Zone			Zone	Zone	
			1	2	3	4	5	5	6	7	8	8	9
M110 & M115	M2A2 & M2A1	AGENT, GB or VX M426	x	x	x	x	x	x	x	x	No	No	No
		HE, M106	x	x	x	x	x	x	x	x	No	No	No
		HE, M404	x	x	x	x	x	x	x	x	No	No	No
M110A1	M201	HERA, M650 Rocket On								x	x	x	No
		HERA, M650 Rocket Off	x	x	x	x	x	x	x	x	x	x	No
		HE, M106	x	x	x	x	x	x	x	x	x	x	No
		HE, M404	x	x	x	x	x	x	x	x	No	No	No
M110A2	M201A1	HE, M106	x	x	x	x	x	x	x	x	x	x	x*
		HE, M404	x	x	x	x	x	x	x	x	No	No	No
		HERA, M650 Rocket On								x	x	x	x
		HERA, M650 Rocket Off	x	x	x	x	x	x	x	x	x	x	x
		HE, M509A1	x	x	x	x	x	x	x	x	x	x	x
		AGENT, GB or VX M426	x	x	x	x	x	x	x	x	x	x	x

*M106 Projectile can be fired w/M557, M739, M572, M728, M732. MS82 and MS87 Fuzes at this zone. The MS64 can only be fired with the M106 Projectile with zones 1 through 8.

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APPENDIX C

DODAC LISTING

DODAC	ITEM
1310-B470	Cartridge, 40mm: HE, M384
1310-B475	Cartridge, 40mm: Canopy Yellow Smoke, M676
1310-B477	Cartridge, 40mm: Canopy White Smoke, M680
1310-B479	Cartridge, 40mm: Canopy Red Smoke, M682
1310-B480	Cartridge, 40mm: Practice, M385
1310-B504	Cartridge, 40mm: Parachute, Green Star, M661
1310-B505	Cartridge, 40mm: Parachute, Red Star, M662
1310-B506	Cartridge, 40mm: Ground Marker Red Smoke, M713
1310-B508	Cartridge, 40mm: Ground Marker Green Smoke, M715
1310-B509	Cartridge, 40mm: Ground Marker Yellow Smoke, M716
1310-B519	Cartridge, 40mm: Practice, M781
1310-B526	Cartridge, 37mm: TP M63, MOD1
1310-B534	Cartridge, 40mm: Multiple Projectile, M576
1310-B535	Cartridge, 40mm: Parachute, White Star M583A1
1310-B536	Cartridge, 40mm: Cluster, White Star, M585
1310-B542	Cartridge, 40mm: HEDP, M430
1310-B546	Cartridge, 40mm: HEDP, M433
1310-B552	Cartridge, 40mm: AP-T, M81A1 and M81
1310-B559	Cartridge, 40mm: HE-T, SD, MK11, MK2, MV2890
1310-B562	Cartridge, 40mm: HE-T SD, MK11, MK2 MV2870 and SD, M3 or M3A1, MV2700
1310-B564	Cartridge, 40mm: TP-T, M91
1310-B565	Cartridge, 40mm: Dummy, M25
1310-B568	Cartridge, 40mm: HE, M381
1310-B568	Cartridge, 40mm: HE, M406
1310-B569	Cartridge, 40mm: HE, M397A1
1310-B569	Cartridge, 40mm: HE, M397
1310-B571	Cartridge, 40mm: HE, M383
1310-B573	Cartridge, 40mm: HE, M684
1310-B574	Cartridge, 40mm: HE, M386
1310-B575	Cartridge, 40mm: HE, M441
1310-B577	Cartridge, 40mm: Practice, M407A1
1310-B577	Cartridge, 40mm: Practice, M382
1310-B584	Cartridge, 40 Millimeter Practice, M918
1310-B585	Cartridge, 57mm: Canister, T25E5
1310-B586	Cartridge, 57mm: HE, M306A1 and M306
1310-B587	Cartridge, 57mm: HEAT, M307A1 and M307
1310-B588	Cartridge, 57mm: TP, M306A1
1310-B590	Cartridge, 57mm: Smoke, WP, M308A1 and M308
1310-B627	Cartridge, 60mm: Illuminating, M83A3, M83A2, and M83A1
1310-B629	Cartridge, 60mm: Training, M69
1310-B630	Cartridge, 60mm: Smoke, WP, M302
1310-B630	Cartridge, 60mm: Smoke, WP, M302A1 302E1)
1310-B632	Cartridge, 60mm: HE, M49A3 (M49A2E1) and M49A2
1310-B632	Cartridge, 60mm: HE, M49A4 (M49A2E2)

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DODAC	ITEM
1310-B633	Cartridge, 60mm: Target Practice, M50A3 (M50A2E1)
1310-B638	Projectile, 64mm: CS M742 and KE M743 with Launcher M234
1310-B642	Cartridge, 60mm: HE, M720
1310-B670	Cartridge, 50mm: Pyrotechnic, M800
1315-C025	Cartridge, 75mm: Blank, M337A2 (M337A1E1), M337A1 and M337
1315-C027w/PD Fuze	Cartridge, 75mm: HE, M48
1315-C028 w/o PD Fuze	Cartridge, 75mm: HE, M48
1315-C033	Cartridge 75mm:, Dummy, M19 or M19B1
1315-C051	Cartridge, 75mm: HE, M309A1 and M309
1315-C052	Cartridge, 75mm: HEAT-T M310A1 and M310
1315-C053	Cartridge, 75mm: HEP-T, M349
1315-C056	Cartridge, 75mm: Smoke, WP, M311A1 and M311
1315-C110	Cartridge, 76mm: HEAT-T, M496
1315-C120	Cartridge, 76mm: AP-T, M339
1315-C121	Cartridge, 76mm: Canister, M363
1315-C122	~-Cartridge, 76mm: HE, M352
1315-C124	Cartridge, 76mm: HVAP-T, M319
1315-C125	Cartridge, 76mm: HVAP-D-S-T, M331A1 and M331A2
1315-C127	Cartridge, 76mm: TP-T, M340A1 and M340
1315-C128	Cartridge, 76mm: Smoke, WP, M361A1 or M361
1315-C131	Cartridge, 76mm: Blank, M355A2
1315-C225	Cartridge, 81mm: HE, M43A1 and M43A1B1
1315-C227	Cartridge, 81mm: Target Practice, M43A1
1315-C228	Cartridge, 81mm: Training, M445 (T32E1)
1315-C230	Cartridge, 81mm: Smoke, WP, M57A1 and M57
1315-C256	Cartridge, 81mm: HE, M374A3(M374A2E1)
1315-C258	Cartridge, 90mm: Smoke, WP,M313 and M313C
1315-C259(MV2800)	Cartridge, 90mm: AP-T, M318, MV2800, and M318 (T33E7) or M318A1, MV3000
1315-C259	Cartridge, 90mm: AP-T,M77
1315-C260	Carttidge, 90mm: APC-T, M82
1315-C261	Cartridge, 90mm: Blank, M394
1315-C262	Cartridge, 90mm: Canister M336
1315-C263	Cartridge, 90mm: Dummy M12, M12B1 and M12B2
1315-C265(M71)	Catiridge, 90mm: HE-T, M71A1 and HE, M71
1315-C266(M71)	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C267(M71)	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C268	Cartridge, 90mm: HEAT, M348A1(T108E46) andM348
1315-C270	Cartridge, 90mm: HVAP-T, M332A1
1315-C275	Cartridge, 90mm: APERS-~M580
1315-C276	Cartridge, 81mm: Smoke, WP,M375A2 and M375A1
1315-C276	Cartridge, 81mm: Smoke, WP,M375A3
1315-C276	Cartridge, 81mm: Smoke, WP,375
1315-C280(M71A1)	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C282	Cartridge, 90mm: HEAT, M371A1
1315-C283	Cartridge, 90mm: Practice, M371
1315-C285(MV300)	Cartridge, 90mm: AP-T, M318, MV2800, and M318(T33E7) or M318A1, MV3000
1315-C290	Cartridge 90mm: TP-T,M353(T22E1J M353A1(M353E1) and M353A2
1315-C294	Cartridge, 90mm: HEAT-T M431(T300E59JM431A), and M431A2

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DODAC	ITEM
1315-C410	Cartridge, 90mm: Canister Antipersonne~ M590 (XM590E1)
1315-C429	Cartridge, 105mm: HEP-T, M393A2 and M393A1
1315-C440	Cartridge, 105mm: Blank, M395
1315-C441	Cartridge 105mm: Agent, GB,M360
1315-C442	Cartridge, 105mm: Agent, Hor HD,M60
1315-C444	Cartridge, 105mm: HE,M1
1315-C448	Cartridge, 105mm: HE,HEP-T,M327 (T81E28)
1315-C449	Cartridge, 105mm: Illuminating, M314, M314A2, M314A2B1
1315-C449--	Cartridge, 105mm: Illuminating, M314A3
1315-C450	~-Cartridge, 105mm: Leaflet M84B1
1315-C452	Cartridge, 105mm: H.C. BE, M84 Series
1315-C454	Cartridge, 105mm: Smoke, WP,M60 Series
1315-C457	Catiridge, 105mm: TP-t,M67
1315-C458	Cartridge, 105mm: Dummy M14
1315-C462	Cartridge, 105mm: He,M444
1315-C463	Cartridge, 105mm: HERA, M548
1315-C468	Cartridge, 105mm: Tactical CS,M629
1315-C469	Cartridge, 105mm: HE, M413(T377E1)
1315-C472	Cartridge, 105mm: HEAT-T, M622
1315-C473	Cartridge, 105mm: HE,M760
1315-C494	Cartridge, 105mm: APDS-T, M467
1315-C505	Cartridge, 105mm: APDS-T,M392A2and M392
1315-C506	Cartridge, 105mm: APDS-T,M392A2 and M392
1315-C508	Cartridge, 105mm: HEAT-T, M456 Series
1315-C510	Cartridge, 105mm: TP-T.M467
1315-C511	Cartridge, 105mm: TP-T, M490
1315-C511	Cartridge, 105mm: TP-TM490A1
1315-C512	Cartridge, 105nmmun: Smoke, WP-T, M416
1315-C513	Cartridge, 105mm: APERS-~M546
1315-C514-----	Cartridge, 105mm/ Dummy M457
1315-C518----------	Cartridge, 105mm: HEP-'T,~M393A2 and M393A1
1315-C519	Cartridge, 105mm: APERS-TM494
1315-C520----	Cartridge, 105mm: TPDS-T, M724A1 and M724
1315-C521------	Cartridge, 105nm: APFSD-TM735
1315-C524----------	Cartridge, 105mm: APFSDS-T,XM833
1315-C533	Cartridge, 105mm: TPCSDS-TD M128(Patrone, 105mm, DM128)
1315-C543	Cartridge, 105mm: APFSDS-~M900
1315-C570	Cartridge, 165mm: HEP,M123A1 and M123
1315-C601 ---	Cartridge, 90mm: Canister, M377
1315-C650 ---	Cartridge, 106mm: HEAT,M344A1 and M344
1315-C651--	Cartridge, 106mm: HEP-T,M346A1
1315-C654	Cartridge, 106mm: Dummy M368
1315-C660	Cartridge, 106mm: APERS-T, M581
1315-C699----	Cartridge, 4.2-Inch: HE, M329A2(M329A1E1) w/oFuze
1315-C701	Cartridge, 4.2-Inch: Gas, M2A1and M2, CNB,CNS
1315-C703	Cartridge, 4.2-Inch: Gas, M2A1and M2, H,HD,HT
1315-C704	Cartridge, 4.2-Inch: HE, M3A1and M3
1315-C704--	Cartridge, 4.2-Inch: HE, M329and M329B1 w/Fuze
1315-C704	Cartridge, 4.2-Inch: HE, M329A1w/Fuze
1315-C704	Cartridge, 4.2-Inch: HE, M329A2(M329A1E1) w/Fuze
1315-C705--	Cartridge, 4.2-Inch: HE, M329and M329B1 w/oFuze
1315-C705	Cartridge, 4.2-Inch: HE, M329A1 w/o Fuze

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DODAC	ITEM
1315-C706	Cartridge, 4.2-Inch: Illuminating, M335A1 and M335
1315-C706	Cartridge, 4.2-Inch: Illuminating, M335A2
1315-C708	Cartridge, 4.2-Inch: Smoke, PWP or WP M2A1 and M2
1315-C708	Cartridge, 4.2-Inch: Smoke, WP,M328A1 and M328
1315-C710	Cartridge, 4,2-Inch: Tactical CS,M630
1315-C784	Cartridge, 120mm: TP-T, M831
1315-C785	Cartridge, 120mm: TPCSDS-T,M865
1315-C787	Cartridge, 120mm: HEAT-MP-T, M830
1315-C800	Projectile, 120mm: HE-T,M356(T15E3)
1315-C802	Projectile, 120mm: AP-T,M358
1315-C804	Projectile, 120mm: TP-T, M359E2(T14E7)
1315-C806	Projectile, 120mm: Smoke,WP-T, M357 (T16E4)
1315-C807	Projectile, 120mm: HEAT-T, M469(T153E15)
1315-C868	Cartridge, 81mm: HE,M821
1315-C869	Cartridge, 81mm: HE,M889
1320-D001	Canister D~M20 for Projectile, 155mm: GB2, M687
1320-D002	Canister OPA, M21 for Projectile, 155mm: GB2, M687
1320-D003	Projectile, 155mm, HE, M483A1
1320-D380 (M411)	Cartridge, 152mm: TP-T, M411
1320-D381	Cartridge, 152mm: HEAT-T-MP-M409A2, M409A1, andM409
1320-D383 (M411A3J M411A2, and M411A1	Cartridge, 152mm: TP-T, M411 Series
1320-D390	Cartridge, 152mm: Caniste~M625A1 and M625
1320-D493	Charge, Propelling, 175mm: M86 Series
1320-D500	Cartridge, 152mm: Dummy M596
1320-D501	Projectile, 155mm: HE,M692
1320-D502	Projectile, 155mm: HE,M731
1320-D503	Projectile, 155mm: AT,M718
1320-D505	Projectile, 155mm: Illuminating, M485 Series
1320-D506	Projectile, 155mm: Smoke, HC, M116A1
1320-D509	Projectile 155mm: AT,M741
1320-D510	Projectile, 155mm: HEAT, Cannon-Launched, Guided, M712
1320-D511	Projectile, 155mm: Training, M823
1320-D513	Projectile, 155mm: Practice, M804/M804A1
1320-D514	Projectile, 155mm: M741E1
1320-D515	Projectile, 155mm: M718E1
1320-D528	Proj0ectile, 155mm: Smoke, WM825/M825A1
1320-D529	Projectfle, 155mm: HE,M795
1320-D532	Charge, Propelling, 155mm: M203A1
1320-D533	Charge, Propelling, 155mm: M119(M119A1)
1320-D533	Charge, Propelling, 155mm: M119A2
1320-D533	Charge, Propelling, 155mm: M203
1320-D535	Projectile, 175mm: Dummy,M458 with Charge Propelling: Dummy M98
1320-D539	Projectile, 155mm: Dummy M7 with Charge, Propelling: DummyM2
1320-D540	Charge, Propelling, 155mm: M3 Series
1320-D541	Charge, Propelling, 155mm: M4 Series
1320-D542	Projectile, 155mm: GB (Non-Persistent), M121A1
1320-D543	Projectile, 155mm: Agent H/HD, M110
1320-D544	Projectile, 155mm: HE, M107 (Deep Cavity)
1320-D545	Projectile, 155mm: Illuminating, M118 Series
1320-D548	Projectile, 155mm: Smoke, BE, M116 and M116B1, HC
1320-D548	Projectile, 155mm: Smoke, HC, M116, M116B1

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DODAC	ITEM
1320-D549	Projectile, 155mm: Smoke, BE, M116 and M116B1, Red
1320-D550	Projectile, 155mm: Smoke, WP,M110 and M110A1
1320-D550	Projectile, 155mm: Smoke, WM110A1 (M110E2L M110A2(M110E3)
1320-D551	Projectile, 155mm: Smoke, BE, M116 and M116B1, Yellow
1320-D552	Reduceq Flash: M2(T2)
1320-D553	Projectile, 155mm: Dummy M7: Dummy,M2
1320-D554	Projectile, 155mm: Smoke, BE, M116 and M116B1, Violet
1320-D561	Projectile, 155mm: HE, M449 and M449E1
1320-D562	Projectile, 155mm: HE, M449A1, M449E2
1320-D563	Projectile, 155mm: HE,M483A1
1320-D864	Projectile, 155mm: Extended Range, DP,M864
1320-D568	Projectile, 155mm: VX(Persistent), M121A1
1320-D570	Projectile, 155mm: HE, M107 (Normal Cavity)
1320-D572(M437A2, M437A1) w/ Supplementary Charge	Projectile, 175mm: HE, M437A2and M437A1
1320-D579	Projectile, 155mm: HERA, M549
1320-D579	Projectile, 155mm: HERA, M549A1
1320-D581	Projectfle, 155mm: Tactical CS, XM631
1320-D590	Cartridge, 165mm: TP,M623
1320-D591(M437A1, M437A2w10 Supplementary Charge)	Projectile, 175mm: HE, M437A2and M437A1
1320-D592	Cartridge, 152mm: HE-T, M657
1320-D594	Projectile 55mm: GB2, M687
1320-D624	Projectle 8-Inch: HERA, M650
1320-D651	Projectfle, 8-Inch: HE, M509A1
1320-D661	Charge, Propelling, 8-Inch: M188
1320-D662	Charge, Propelling, 8-Inch: M188A1
1320-D675	Charge, Propelling, 8-Inch: M1
1320-D676	Charge, Propelling, 8-Inch: M2
1320-D667(M4)	Projectile, 8-Inch: Dummy M14, with Charge PropellingDummyM4
1320-D679(M14)	Projectile, 8-Inch: Dummy M14, with Charge, Propelling Dummy M4
1320-D679	Projectile, 8-Inch: Dummy M845
1320-D680	Projectfle, 8-Inch: HE,M106
1320-D681	Reduce L Flash: M3(T3)
1320-D684	Projectfle, 8-Inch: HE,M404
1320-D695	Projectfle, 8-Inch: Agent, VX(Persistent), M426
1320-D696	Projectile, 8-Inch: Agent GB (Non-Persistent), M426
1320-D709(M458)	Projectfle, 175mm: Dummy M458with Charge, Propelling: Dummy M98
1390-N248	Fuze, Mechanical Time: M565
1390-N276	Fuze, Mechanical Time, and Superquick: M501A1(or M501)
1390-N278	Fuze, Mechanical Time, and Superquick: M564
1390-N280	Fuze, Mechanical Tinle, and Superquick: M520A1 and M520
1390-N282	Fuze, Mechanical Time, and Superquick: M548
1390-N283	Fuze, Mechanical Time: M562
1390-N285	Fuze, Mechanical Time, and Superquick: M577

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DODAC	ITEM
1390-N286	Fuze, Mechanical Time, and Superquick: M582
1390-N308	Fuze, Point Detonating: M524 Series
1390-N309	Fuze, Point Detonating: M526 Series
1390-N310	Fuze, Point Detonating: M716
1390-N311	Fuze, Point Detonating: M572
1390-N314	Fuze, Point Detonating: M717
1390-N318	Fuze, Point Detonating: M48 Series
1390-N326	Fuze, Point Detonating: M508A1and M508 Series
1390-N330	Faze, Point Detonating: M78Series (Non-delay)
1390-N331	Fuze, Point Detonating: M78Series (0.025 Delay)
1390-N334	Fuze, Point Detonating: M567
1390-N335	Fuze, Point Detonating: M557
1390-N340	Fuze, Point Detonating: M739
1390-N402	Fuze, Proximity: M532
1390-N411	Fuze, Proximity: M514, M514B1, M514A1
1390-N412	Fuze, Proximity: M513and M513B1
1390-N412	Fuze, Proximity: M513A1and513A2
1390-N417	Fuze, Proximity: M517
1390-N462	Fuze, Proximity: M514A3(M514A1E1)
1390-N463	Fuze, Proximity: M728
1390-N523	Primeq Percussion: M82
1390-N525	Prime~ Percussion: MK2A4
1390-N535	Primeq E1ectric, and Percussion: MK15, M0DS 2and 3
1390-N600	Fuze, E1ectronic Time: M587
1390-N601	Fuze, E1ectronic Time: M724
1390-N464	Fuze, Proximity: M732

* U.S. G.P.O.: 1994-546-043:80740

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GORDON R. SULLIVAN
General, United State Army
Chief of Staff

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Administrative Assistant to the Secretary of the Army
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ATTN: SP4 Jane Doe
Key West, FL 33040

DATE SENT
13 May 1993

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	16 Jan 1993	Unit of Radar Set AN/MPO Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
9-19		9-5	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

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